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**CRITICS
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**V. S. Ipatov and L. A. Kirikova. *Fitotsenologiya* (Phytocenology),
St. Petersburg: St. Petersburg Gos. Univ., 1997, 315 p.**

A new textbook on phytocenology is a remarkable event for both geobotanists and specialists in ecology, as it deals with a wide range of problems connecting these two scientific fields.

In the Introduction, the authors consider vegetation as a specific functional element of any ecosystem, which interacts with its environment and transforms the latter. At the same time, “vegetation and processes occurring in it are essential and specific only for it, rather than to the ecosystem as a unity” (p. 19).

Rightly emphasizing the dominant role of the plant cover as a source of energy and organic substances in the biosphere, the authors dedicate the first chapters of their textbook to interactions with ecological factors, the edificatory role of plants, and the interrelationships in plant communities, i.e., to ecological issues. The comparison of ecological scales proposed by different authors, which was performed in this book, and its promising result are extremely important for the analysis of superorganism biosystems of any rank (populations, cenoses, and ecosystems). The ecological assessments of species according to different scales are close to each other. At the same time, all species are distributed over the scale uniformly, without any gaps, and the section dedicated to the indicatory properties of species is quite appropriate in this context. Subsequently, the authors use a concrete example to analyze the methods for assessing ecological characteristics of an area by lists of cenopopulations of species comprising a certain phytocenosis and, in addition, propose two new indices: reactivity and the threshold of species sensitivity to changes in ecological factors. In our opinion, this is a promising approach to problems of indication.

Chapter 3 is very interesting and rich in factual data. It concerns the formation of the phytocenosis via changes in the light, thermal, and hydrologic regimes of habitats, the nutrient cycle, transformation of organic matter, and allelopathic interactions of cenopopulations. In a logical sequence comes the final section dealing with the difference between ecotope and biotope, the latter being regarded as an ecotope transformed by the biocenosis. The authors sensibly included in this chapter the section on the phytogenic field, edificators, assectators, and dominants. We disagree only with their assertion that A.A. Uranov considered only the phytogenic field of individual plants. In the paper published posthumously (*Biol. Nauki*, 1975, no. 2, pp. 7–34), Uranov introduced the concepts of phytogenic fields of the cenopopulation and the phy-

tocenosis, which perfectly conform to the hierarchy of biosystems in the Earth's biosphere.

Chapter 4 concerns interrelationships of plants in communities, which are classified in detail and characterized in their different manifestations. On the basis of vast factual data, both their own and of other researchers, the authors thoroughly analyse present-day interpretations of concepts such as competition, self-limitation, thriving, comfort, elimination, interdependence, etc.

In our opinion, the section dealing with phytocentotypes is too brief, although this problem has priority in Russian phytocenology owing to studies performed by L.G. Ramenskii and his followers, who developed in sufficient detail the theory of specific strategies of violents, patients, and explers. This may be attributed to the classic concepts of geobotanists, for whom it is safer and simpler to use categories that do not require population analysis.

Chapters 6–8 are traditional and fundamental. They contain abundant theoretical and factual material on the composition and structure of the plant cover, the problem of its continuity and discreteness, dynamic phenomena of different order, and, finally, the classification of phytocenoses. The authors adequately describe various ideas that have been formed in different geobotanical schools, Russian and foreign.

In our opinion, the concepts concerning elements of phytocenosis as a superorganism system are debatable. The authors introduce the concept of infracenoelements (cenocell, synusia, hypersynusia) and ultracenoelements (conome, cenome, synome). The scope of the former is limited to representatives of one or several layers or the plant cover, whereas ultraelements “include all the individuals along the vertical axis of the plant cover” (p. 165). However, if the systemic approach is used, which assisted in understanding the hierarchical structure of biosystems, it becomes apparent that neither of the proposed is actually an element of the cenotic system in a commonly accepted sense; rather, they can be regarded as subsystems. Elements should be represented by biosystems of the previous population level, and these are cenopopulations of species comprising a phytocenosis. Such an approach was proposed by T.A. Rabotnov, A.A. Korchagin, and A.A. Uranov. The subsequent development of population ecology demonstrated the necessity of combining the approaches used by phytocenologists and population ecologists. For instance, O.V. Smirnova

and R.V. Papadyuk used the population-ontogenetic approach as the basis for formulating their concept of elementary demographic units. What is the relationship between elementary demographic units and cenoelements? Is it really possible to distinguish subsystems such as conome, synome, and cenome in territories examined? These questions require further investigation and discussion.

It is no less difficult to reveal the relationships between phytocenosis and zoocenosis, mycocenosis, microbiocenosis, and the entire ecosystem integrating these subsystems. Although their existence has already been proven qualitatively, the quantitative ratios and even a set of consorts in each particular instance have been studied insufficiently. The authors of the textbook try to solve this problem by introducing the concept of confascia as an aggregation of individuals and their symbionts (parasites, hemiparasites and symbionts proper). These problems obviously pertain to the next level of integration, i.e., the theory of ecosystems (bio-

geocenology), but their development directly depends on progress in studies performed at the cenotic level.

In conclusion, we should express our appreciation of the authors' refined language, presentation of material in a strict logical sequence, deference and correctness in discussing different views on the most complicated unsolved problems, ability to propose original approaches, and rare gift of presenting vast factual data in a concise and intelligible form.

Undoubtedly, ecologists, phytocenologists, dendrologists, specialists in grassland science and other fields of applied biology now have at their disposal not only a textbook of theoretical phytocenology, but also an everyday reference book, which will be useful for students, postgraduates, and researchers.

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