

TWO QUESTIONS ABOUT TREES

The Białowieża issue is a question of values.



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Before we make any decisions on managing the Białowieża Forest, we must first answer two crucial questions: what are the differences between the natural and managed forest ecosystems, and what is the significance of those differences. We can rely on natural science to provide a reliable, precise answer to the first question. Given the application of the scientific method any differences of opinion are ultimately temporary, as sooner or later they will be resolved by empirical data. However, answering the second question does not lie in the domain of natural science: instead it depends on the subjective, frequently conflicting hierarchies of values professed by the various stakeholders.

We can summarize our current understanding of the first question by searching through scientific publications and textbooks. The most notable feature of forest ecosystems is the balance of carbon and energy, in which the vast majority (>95%) of carbon reduced during photosynthesis is turned into dead organic matter and serves as a source for trophic webs of decomposers and detritivores rather than herbivores. This means that species numbers and biodiversity depend on the volume of dead biomass. Extensive experimental data and meta-analyses reveal that the volume of deadwood has a major effect on the diversity of the entire forest biota, and not just on saproxylic invertebrates. In a managed forest, the majority of reduced carbon compounds are exported, which has a knock-on effect through the entire network of trophic interactions in the ecosystem. Meticulous meta-analysis of available data on the impact of forest management on biotic diversity reveals that it is generally reduced, with a few specific exceptions such as an increased number of invasive and

ruderal species. Forest gaps are commonplace in all natural forest ecosystems. They follow a so called disturbance cycle: after a localized disaster (windthrows, insect outbreaks, death of very old trees), the gap is gradually filled by a succession of various species until the original composition is restored. This natural succession dramatically differs from the artificial one in managed forests, where cleared areas are replanted with seedlings. Disturbance cycles are typical for all natural forest ecosystems in the world. The phenomenon is described in many publications from elementary-level textbooks to the latest meta-analyses. Recent studies show that the life cycle strategies of many species are evolutionarily adapted to such cycles, which may also enhance their genetic polymorphism. This all supports the theory that bark beetle infestations are natural events in forest ecosystems. The various participants in this complex interaction (such as insects, trees and fungi) have been co-evolving for at least 100 million years. A recent study of Siberian taiga estimated the durations of such natural cycles, which seem very long from the human perspective: healing up a clearing caused by wind or an insect infestation can take around 150 years to fill, while one caused by a major fire can take as long as 400 years.

Is the Białowieża Forest natural? We should probably start by resolving a common misunderstanding: people frequently confuse naturally-functioning ecosystems with “virgin” areas – environments completely untouched by human activity. In fact there are no virgin or primeval forests left anywhere on Earth. Even the deepest tropical forests of South America show traces of ancient civilizations, though of course huge swathes of these forests are completely natural. Europe is dominated by forests which have been cultivated for hundreds if not thousands of years, so it’s difficult to find ecosystems which resemble a purely natural state. The Białowieża Forest is something of an exception. Paleoecological and archaeological data reveal that

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human presence in the Białowieża region had no major impact on natural ecosystems for thousands of years; it was not until the early 20th century that the forest started being heavily exploited by mass felling of trees, removal of timber and replanting the resulting spaces, all of which continue until the present day. The unique, diverse biota of the region, documented in hundreds of publications, is testament of the limited impact of human activity on Białowieża's ecosystems.

So what does this mean in practice? What's more important: producing timber or protecting forests? If we choose conservation, then should we focus on protecting specific ecosystems or randomly selected species? Who or what should we be protecting them from – bark beetle infestations or human intervention? Natural science won't supply us with answers to any of these questions. Any decisions would need to be made based on a hierarchy of values, and those vary greatly from person to person.

To understand why people's value systems differ so greatly and elucidate the cause/effect mechanisms of how these views develop and become fixed, we should look to aspects of the humanities such as axiology, ethics and aesthetics, as well as sociology, psychology and even evolutionary anthropology, which studies the human brain – surprisingly unchanged since the Paleolithic. The dispute over the future of the Białowieża Forest abounds with such conflicts: on one hand the values are practical, economic (profits from logging) and aesthetic (the desire for a tidy environment), while on the other there are abstract autotelic values, such as preserving natural ecosystems and contrasting aesthetics (a preference for an untidy environment). The clash of values seems irredeemable given that the Białowieża Forest is a mosaic of protected and managed areas; the existence of discrete reserve areas means that efforts to prevent infestations, routinely undertaken by wardens in managed areas, are largely pointless. Additionally, conservation of natural ecosystems which are scattered like islets amidst a sea of managed forests cannot be effective. Unless the entire Białowieża Forest becomes a national park with consistent conservation and management policies, these conflicts will not be resolved and scientific debates will verge on the absurd.

Natural science is not concerned with values or beliefs, but its practitioners certainly are. Just like all other people, scientists are guided by their chosen value systems, with science given a high autotelic, not just utilitarian, value. It should come as no surprise, then, that many naturalists see conservation of forest ecosystems as unique sites for research, especially those closest to natural conditions, as something invaluable. ■



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