Ecology education for forestry students

Jacob Weiner
Professor, Institut for Økologi

KVL Mosaik 7 (13), 6-7, 1999

There has been much discussion recently about ecology education for forestry students at KVL. Ecology is an increasingly important area within forestry and within forestry education.

I believe there is much misunderstanding about ecological science and its role in forestry and in forestry education. This is the result of two separate but related changes that are occurring: (1) The development of ecology from a descriptive into an experimental, mechanistic science, and (2) a change in forestry from a primary emphasis on wood production to a more multi-faceted view of forests.

(1) Ecology is a young science that has roots in many different areas of biological and related sciences, including taxonomy, physiology, botany, zoology, microbiology, mathematics, engineering and geology. This is reflected in KVL's curriculum, where ecology is introduced within other subjects, not as a subject itself. For example, the first course in ecology for forestry students is Zoologisk økologi. But the emergence of ecology is closely related to its development as the *interdisciplinary* science concerned with the abundance and distribution of organisms. My own field, plant ecology, has traditionally focussed on the description of vegetation, but in recent years plant ecology has shifted towards an emphasis on the mechanisms that determine vegetation processes. All sciences start with description, but as they develop the focus shifts to mechanisms. Yet in much of central Europe, plant ecology still means descriptive studies of vegetation. Similarly, plant ecology education for forestry students at KVL still emphasizes the description of vegetation. For example, the basic course in botany for forestry student covers the morphology, taxonomy and ecology of plants. The ecology part of this courses emphasizes the species composition of plant communities and, to some degree, its relationship to environmental factors. The description of plant communities is a traditional part of plant ecology, but it is no longer a reasonable *introduction* to plant ecology. Similarly, the course Global Forest Botany and Vegetation types (Forstbotanik) covers both taxonomy and plant geography/ecology of the world's major forest systems. The plant geography/ecology part of this course emphasizes the description of world forest vegetation types, with very little emphasis on what determines vegetation – the principles of plant ecology and biogeography.

As a botanist, I would not be satisfied if the important basic subjects of plant morphology, taxonomy, physiology and genetics were taught only within courses that are primarily focussed on ecology. As an ecologist, I am not satisfied that the important basic subject of ecology is taught in courses that are focussed on other areas. This is the situation at KVL. Today's forestry students need ecology as much as these other subjects. The modern

approach to teaching ecology is to separate taxonomy/morphology from ecology at the introductory level and to create an ecology curriculum.

(2) Not only have there been major changes in the science of ecology over the last 25 years, but forestry itself is changing rapidly. Until recently, forestry was pretty much the applied science of wood production. While production of wood is still extremely important in forestry, we have now come to appreciate that forests perform numerous other ecological and economic functions. The ecological functions include the role of forests in carbon balance, species conservation, amelioration of pollutants, etc. Economic functions include recreation and tourism, and production of products other than wood. These ecological and economic functions are especially important in the tropical regions, were deforestation for timber has devastating effects on humans and ecosystems, and where conservation requires the development of sustainable forest products industries and the preservation of genetic resources.

Ecology education for forestry students should no longer emphasize specialized knowledge and skills, but a broad and deep understanding of forests in terms of individuals, populations, communities and ecosystems. This begins with knowledge of basic ecological principles, as well as the other basic subjects such as botany, zoology and soil science. Plant ecology and forest ecology should be advanced topics, after students learn basic ecology. Arguing that forestry students should have their own introductory ecology courses would be like arguing that they should have their own introductory mathematics courses. The forestry study program should be distinguished from the other course programs by the advanced courses, not by the introductory courses. But it is not possible to have a new, modern general ecology course while still maintaining all the current courses, and forestry students have no room in their study program for any new courses, because the forestry study program has far too many obligatory courses! Having so many obligatory courses prevents the incorporation of new areas such as ecology into the forestry study program. In fact, it prevents change and growth in many ways. In this context, I urge the forestry study committee to reduce the number of obligatory courses to a minimum, so that forestry students can better influence their own education by choosing which courses to take.

Some of the misunderstandings about forestry and ecology can be traced back to the traditions of forestry in Denmark, and the traditions of forestry studies at KVL. There was a time when almost all forestry students went into positions managing Denmark's forests, but now, more and more forestry students will become managers of land use, not only forests but also other ecosystems in the landscape. They will become planners and decision makers. And they will be applying these skills in other parts of the world.

In my view, a good ecology education for forestry students would start with a course in general ecology, corresponding overall to one the major textbooks in ecology, but with special emphasis on production ecology and a somewhat reduced emphasis on purely "natural" systems. This could be followed by a forest ecology course, such as is offered now, emphasizing the types of

forests found in Denmark and surrounding regions. The forest ecology course would no longer need to cover basic ecological concepts and principles. These two “core” ecology courses for forestry students would serve as good preparation for various other advanced courses in different areas of ecology and forest ecology, and would be a good minimum preparation for students who want to know something about forest ecology but who choose to focus their studies in other areas of forestry.

Forestry is applied ecology: the manipulation of an ecosystem for human purposes. The term “ecosystem management” originally came from forest ecologists. The skills of forestry in the future are closely related the skills of modern ecology. Forestry students are going to have to deal with complex problems, problems whose parameters are not clearly defined in advance. For example, they will need to address different “currencies” both biological and economic. A high degree of analytical and critical skills will be needed to see the possibilities and the contradictions of conflicting interests, economic, political and biological, that influence land use. Forestry students need to understand ecological science as a way to pose and address questions, not as a series of facts to be memorized. The ability to ask the right question or design the right study will be more important than the traditional skills of forestry. I would say that forestry students need the best *education*, not the best *training*. One way to do this is to develop ecology as a basic subject at KVL, which integrates all the biological aspects of forestry and which can provide the basis for all further work in ecology related to forestry.