SEMINAR: NEMATOLOGY TEACHING

BY

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Teaching of nematology is considered at undergraduate and graduate levels. The educational tools available are discussed together with the use of workshops and advanced courses of instruction. It is proposed that the European Society of Nematologists should establish a Nematological Education Committee to promote educational programmes in universities and institutions.

Keywords: teaching, workshops, educational tools, training, collaboration.

Nematology consists of a large body of knowledge representing a significant subject area in biological science, which contains a lot of facts, rules and hypotheses. The major goal of education is to promote the transfer of knowledge and skills to students, but they not only need to understand what this knowledge means, and how problems can be solved, but they also need to appreciate which problems are not yet capable of solution.

Frequently we hear that today’s university students are passive and that many of them do not participate in classroom teaching activities which is a great pity since there is evidence that active participation in learning leads to much better understanding and retention of what is taught. But is this true? If true, whose fault is it? Theirs? Ours? Do we spoonfeed them?

Learning is improved when it involves a team effort which ought to be collaborative and social and not competitive and isolated. Working with others enhances learning and sharing ideas improves thinking and deepens understanding. Students attend courses expecting to acquire mainly information. We should try to discuss and improve curricula, develop new educational technologies and thus increase student interest and enthusiasm for nematodes. Teachers have to be creative in their teaching using various methods and different ways of attaining their objectives.

In recent years the main emphasis has been on plant-parasitic nematodes, especially those causing diseases of economic importance to crops. Great progress has been made in learning about plant-parasitic nematodes, but also about the closely related free-living and the entomophilic ones. Nematodes, particularly free-living ones, are very good models for studying a variety of complex biological problems such as: 1) biology and physiology of ageing; 2) the basic mechanisms of senescence and longevity; 3) genetic basis of eukaryotic development and animal behaviour; 4) nutritional and molecular biology.

Such insights underline the importance of maintaining nematology as an active research discipline and of continuing to invest in this discipline.

For the future there should be more liaison between teaching and technological innovations to ensure that nematology becomes increasingly interesting, exciting, fascinating and relevant. The main objectives of this seminar were: 1) to promote the
science of nematology; 2) to discuss opportunities for the exchange of ideas among teachers and researchers involved in teaching; 3) to promote training opportunities in nematology for students, scientists and technicians; 4) to stimulate collaboration among the Universities and Research Institutions throughout the world.

UNGRADUATE LEVEL

At the undergraduate level, nematology may be taught in two distinct contexts: firstly, as a zoological subject to emphasise species that are parasitic in domestic animals and Man; secondly, as an agricultural subject with emphasis on crop protection. In either context the undergraduate student will benefit from a realisation that nematology is a multidisciplinary science. So, in order to keep up with the literature the student of nematology needs a background in general biology, genetics, biochemistry, plant anatomy, morphology and physiology, pedology and ecology. Ideally students who wish to specialize in nematology as a career could have a foundation in all these disciplines.

Training in the use of an academic library is very important and is a skill that we owe to our students. The ability to find information is of vital importance as the information base expands and it is less and less possible to retain the knowledge as an individual.

Nematology is also an experimental science. Practical work is therefore important and can provide a method of learning that is different from listening, reading or watching. The major goals of practical work should be to teach manual and observational skills, to improve the understanding and to develop problem-solving skills. Students should also receive training in analysing data and writing up including comparison of their results with information in the literature.

GRADUATE LEVEL

Graduates require to be trained in research by utilising the background acquired from an undergraduate education leading to a Master’s degree or to a Doctorate: many students will achieve the first en route to the second. Nevertheless, it is probably fruitful to consider these two degrees separately.

More students will take a Master than a Doctorate and thus it merits special attention. Essentially a M. Sc. degree can be obtained in three ways: over 1 or 2 years by either course work or research work or by a combination of both. It would be quite impossible for us to give a comprehensive account of the various formats available under these three headings throughout the world and therefore we give a summary of the contents of the M. Sc. course in our Departments.

The M. Sc. course of the Department of Zoology, University of Coimbra, is in Animal Ecology and is a two years full-time course. In the first year students must attend at least five advanced courses on the various aspects of Animal Biology and Ecology, including laboratory work, field work and the new technologies. Lectures are in English and supported by visiting Professors from other countries. During the second year students will carry out an individual research programme in one of the four research areas: 1) nematology; 2) entomology; 3) hydrobiology; 4) ecotoxicology. Evaluation is based on examinations on the different courses and on the thesis.

The M Sc. course in the Department of Agriculture, at the University of Reading in Crop Protection is a one year full-time course. The subject areas covered are Entomology, Plant Pathology, Plant Nematology, Weed Biology / Herbicides, Plant Resistance, Pesticide Chemistry, Experimentation (Statistics), Crop Agronomy related to Pests, Diseases and Weeds and Legislation. Students may study one of the above subjects in depth and will also be required to undertake a five-month project after examination in April.