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THE TEACHING OF PLANT PATHOLOGY

W. H. DAVIS

It is not the intention of the writer to give an exhaustive treatise on the teaching of Plant Pathology but to stimulate thought for better methods of teaching, for broader presentation of the subject and for more practical courses.

Plant pathology is a comparatively new science, having its origin about 1855 when de Bary published his classic "Die Brand Pilze." Many sciences have been developed for generations thereby affording a greater lapse of time for the thorough organization of the subject matter. A great part of this material has been passed on to the layman by word of mouth. War, manufacture, commercialism and other agencies have added their bit to the usefulness of the older sciences. Great impetus has been given to the development of plant pathology during the war by the propaganda for the eradication of the barberry and by the Plant Disease Survey of the U. S. Government. As one worker has expressed it, "Plant Pathology is coming into its own."

The methods of placing the practical facts of plant pathology before people who can use them most effectively, should be improved. At present, this is being done by literature, courses in agricultural colleges and extension work. It is estimated that only five per cent of the people can intelligently read and apply the subject matter of bulletins, that the courses offered in agricultural colleges are generally too highly specialized for practical purposes and that the extension work in this line is negligible and often unsatisfactory. Be that as it may, better means for informing the people should be employed. It is interesting to note that the losses on thirteen crops for the year 1918 were reported by the U. S. Government on August 1, 1919, as about one and one-third billion dollars. Such a vast leak in our "Ship of State" should be a strong argument for the better dissemination of control methods to save our most important crops.

A member on an Iowa draft board said that he was surprised to know that a great portion of those who registered there for service had no more than a fifth grade education. It is a fact that more than three-fourths of our agricultural population leave

school before reaching the eighth grade and that less than ten per cent ever matriculate in a college or university where instruction in plant pathology is offered. The grades do not present any of the simplest facts of plant diseases, there are no elementary books on the subject and the teachers have never received instruction in it. High school botany is nearly a thing of the past in Iowa, hence the few facts on disease organisms that were formerly presented in that subject are now in a dormant stage. The people who can make the best use of this knowledge do not have the facts of plant pathology presented to them so freely as those of the other sciences.

Agricultural colleges seem to be the Mecca for the dissemination of the subject. The methods of dissemination which they employ seem to fall into four classes which might be designated as pedagogic, practical, mediocre and bewildering.

Pedagogic.—This course connects the laboratory work with the text book. It teaches types of comparison, linking this work to the previous subjects of botany, chemistry, zoology, and other allied sciences. The instructor does not take it for granted that every one is to become a specialist but that everyone there desires to learn the identification of many disease forms, and also the symptomology and controls. The subject matter of this course is adapted to the kind of work for which students are fitting themselves and to the general mentality. Scientific minutiae like the sexuality of the basidiomycetes do not concern this instructor and are no part of the course.

Practical.—In this course, the needs of the students are considered first of all and methods may be laid aside. Laboratory work may or may not be connected with the text lesson. As one professor told the instructor, "Any way to get it across."

Mediocre.—Part of the subject matter is practical, some methods worth while are employed, a few specimens are shown in class. More time is spent on the names of the genera, species, cytological structures of host and parasite, together with experiences of agriculturists.

Bewildering.—Here the instructor presents such a conglomeration of scientific classification; of Latin names of families, genera and species; fruiting forms and structures; together with scientific data, histories and names of investigators, that only a mature individual with excellent preparation and superhuman ambition for studying can fathom "What it is all about." It is a kind of

German school method whereby enough literature on one parasite is cited to keep a student reading all day. The student whose reading discretion is not developed at this stage is bewildered by the multitude of apparently impractical and meaningless terms.

It behooves every teacher of plant pathology to place the interesting and vital facts of the subject matter before the students and farmers in the most attractive and practical way possible. Those now teaching it will some day be considered as pioneers and a great deal depends upon them whether or not this economic science succeeds.

No extensive treatise of laboratory work can be given here but there ought to be some improvement in the method used. In the first place, the object of the task or experiment is not definitely and concisely stated. For example, "To study mold" is not sufficient as an object, because the student can take his text and study mold. This is not an experiment.

There should be a definite distinction between a laboratory period, a study period, a recitation period and a lecture period. Each is a separate kind of clear cut work and ought not to be confused with the others. If the instructor were teaching the different kinds of molds he might have as an object "How may I tell some different kinds of molds?", "How do their spores vary in size, shape, color and formation?", together with other definite questions which cannot be answered by yes or no. Of course, drawings and descriptions should be asked for. The object may be summed up in a conclusion. The instructions for laboratory outlines in plant pathology are generally good. This seems to be the best developed portion of the subject. Probably a little time should be given at the first of the term to teaching methods in scientific drawing and lettering, together with the care and use of the microscope. The questions arise: how many drawings should be copied from reprints and texts? How much of the laboratory should be given to reading text materials? This is for the instructor to decide. The poorer his collection of diseased types, the poorer his equipment and the poorer the instructor, the more time is spent in reading and copying during the laboratory period. Of course, the poorer will be his class, for the power of interpretation and analysis of symptomology will be lost. This will weaken the student's ability of classification which is so necessary before he may know the necessary control for the parasites.

SUMMARY

1. Plant pathology is a comparatively new subject and the subject matter and teaching methods are not so well organized as in the older sciences.
2. The layman knows less about the subject matter than about other sciences which are easily transmitted by word of mouth.
3. Some elementary facts of plant pathology should be taught in our public schools because the greater part of our agricultural population receive education there.
4. Our public schools are doing practically nothing towards preventing an annual loss of one and one-third billions dollars to thirteen of our most important crops.
5. Better pedagogy should be applied to the teaching of plant pathology.
 - a. Let the course be concerned with little about many parasites rather than much about few.
 - b. Let the course be adapted to the class of students.
 - c. Definite questions or objects should be given the students whereby the laboratory periods may be devoted to observation and investigation. This will stimulate research work.
 - d. Definite summaries or conclusions should be given to all work. There should be answers to the objects or questions.

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