Content and Organization of the University-level Course in Plant Propagation

James R. Clark
Center for Urban Horticulture, University of Washington, Seattle, WA 98195

Frederick T. Davies, Jr.
Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843

Additional index words. curriculum, horticulture, education

During 1982, the Propagation Working Group (ASHS) conducted a survey on the content and organization of plant propagation courses. The survey, sent to 112 major colleges or universities, was composed of 4 sections: 1) general information, 2) course organization, 3) course content, and 4) evaluation. The following results were compiled from 28 completed forms.

General information

The average responding department had 156 undergraduate students majoring in horticulture with 3 departments having enrollments of more than 300. The average plant propagation enrollment was 53, ranging from 18–135, with 14 nonmajors. Laboratory section size averaged 21 students, and ranged from 12–50.

HortScience, Vol. 18(6), December 1983
Table 1. Class time devoted to specific topics.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lecture (%)</th>
<th>Laboratory (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
<td>8.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Structures</td>
<td>3.5</td>
<td>3.9</td>
</tr>
<tr>
<td>Water systems</td>
<td>3.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Sexual vs. asexual repro.</td>
<td>6.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Cellaring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiology</td>
<td>12.9</td>
<td>2.3</td>
</tr>
<tr>
<td>Herbaceous</td>
<td>4.1</td>
<td>11.2</td>
</tr>
<tr>
<td>Hardwood</td>
<td>4.1</td>
<td>10.3</td>
</tr>
<tr>
<td>Total</td>
<td>21.1</td>
<td>23.8</td>
</tr>
<tr>
<td>Grafting &amp; budding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiology</td>
<td>12.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Techniques</td>
<td>7.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Total</td>
<td>19.5</td>
<td>21.4</td>
</tr>
<tr>
<td>Layering</td>
<td>5.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Specialized structures</td>
<td>4.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Tissue culture</td>
<td>6.7</td>
<td>8.1</td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiology</td>
<td>14.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Techniques</td>
<td>7.4</td>
<td>14.9</td>
</tr>
<tr>
<td>Total</td>
<td>21.7</td>
<td>20.6</td>
</tr>
<tr>
<td>Other</td>
<td>3.6</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Course organization

The overall organization of plant propagation classes among the responding schools is quite uniform. A "typical" course: 1) is required of horticulture majors; 2) is taught once per year; 3) is given on a semester basis; 4) is worth 3 credits; 5) combines lecture and laboratory; 6) does not have a lab fee; and 7) does not use a glossary.

In addition, despite the availability of a wide range of texts and references (see Selected References), all of the respondents use Hartmann and Kester's Plant Propagation—Principles and Practices as a course text. The only available laboratory manual for a complete propagation course is the Plant Propagation Lab Manual by Frey, Read, and Peale. It is used by 35% of the respondents. The other 65% use their own materials as an outline.

One-half of the respondents take field trips (e.g., nurseries and greenhouses). Lack of funds was the reason most schools gave for not taking field trips.

While very few schools charge a laboratory fee, many required the students to provide their own pruning shears and/or knives.

Course content

Plant propagation is one topic in horticulture in which both the principles and practices are studied. This is reflected by the amount of time spent on theory and application in lecture courses—50% for each. While these percentages ranged from 30% to 70%, this indicates that a significant amount of time is spent covering both aspects of propagation.

The topics of cuttings, grafting/budding, and seed propagation received equal emphasis among courses (Table 1); about 20% of both lecture and laboratory time is spent on these 3 areas. As suggested, the emphasis is on principles in lecture, and on practices in lab. Layering, specialized structures, and tissue culture receive almost equal treatment, 5-8% of class time. The remaining 25% of the average propagation course is devoted to introduction, structures, mist systems, sexual vs. asexual propagation, exams, field trips, and guest lectures.

Course evaluation

We asked the question, "What works?" Student evaluation of propagation courses is used by 27 of the survey respondents. The laboratories mentioned as being "most successful" were: 1) grafting and budding; 2) herbaceous cuttings; 3) "seeds"; 4) tissue culture; and 5) air layering. The achievement of good results and overall student interest were cited as the reasons for success of these laboratories.

In contrast, the laboratories noted as "least successful" were: 1) seed dormancy; 2) grafting and budding; 3) hardwood cuttings; 4) growth regulators; and 5) tissue culture. Lack of time, contamination, poor environmental conditions, the time of year, and fear by the students were cited as reasons for poor results.

It is quite interesting that the same lab exercises appeared on both lists. When asked how their course could be improved, the most popular answer was "better facilities." Perhaps we should be adapting our class to the available facilities and, not necessarily following someone else's procedure.

When asked "What are the strengths of your propagation class?", the most common answers were: 1) gives "hands-on" experience; 2) covers a wide range of subject matter; and 3) is science-orientated. Respondents emphasized that both the practical and conceptual parts of their course were important.

The general area of relating to the "industry" was covered also. Respondents suggested field trips, guest lectures, and internships as ways of increasing student exposure to the field.

General comments

Most respondents attempt to balance the practical aspects of propagation with the basic principles. Laboratories are developed so as to give some hands-on experience. If we are to expose students adequately to the practical aspects of plant propagation, then we must continue to include these practical aspects in our courses—even if the exercise do not turn out to be 100% successful.

One area that most respondents do not include in their lecture/laboratory topic outline is that of production, scheduling, and business. This might seem to be a logical extension of our coverage of the practical side of propagation.

Selected References on Plant Propagation


Sexual propagation

James, J. 1964. Create new flowers and plants—indoors and out. Doubleday, Garden City, N.Y.

In vitro propagation


General references


Laboratory manuals


Journals


U.S. Department of Agriculture Forest Service. Tree Planter's Notes.

*Compiled by: F. Dennis, Michigan State University; H. Hartmann, University of California-Davis; D. Kester, University of California-Davis; and J. Clark, University of Washington.

Received by: P. N. DeRegnier, T. D. Scully, R. E. Miles, and R. B. Truax.

Contributors: P. N. DeRegnier, T. D. Scully, R. E. Miles, R. B. Truax, and the authors.

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