

# A Survey of Plant Tissue Culture Laboratories in North America

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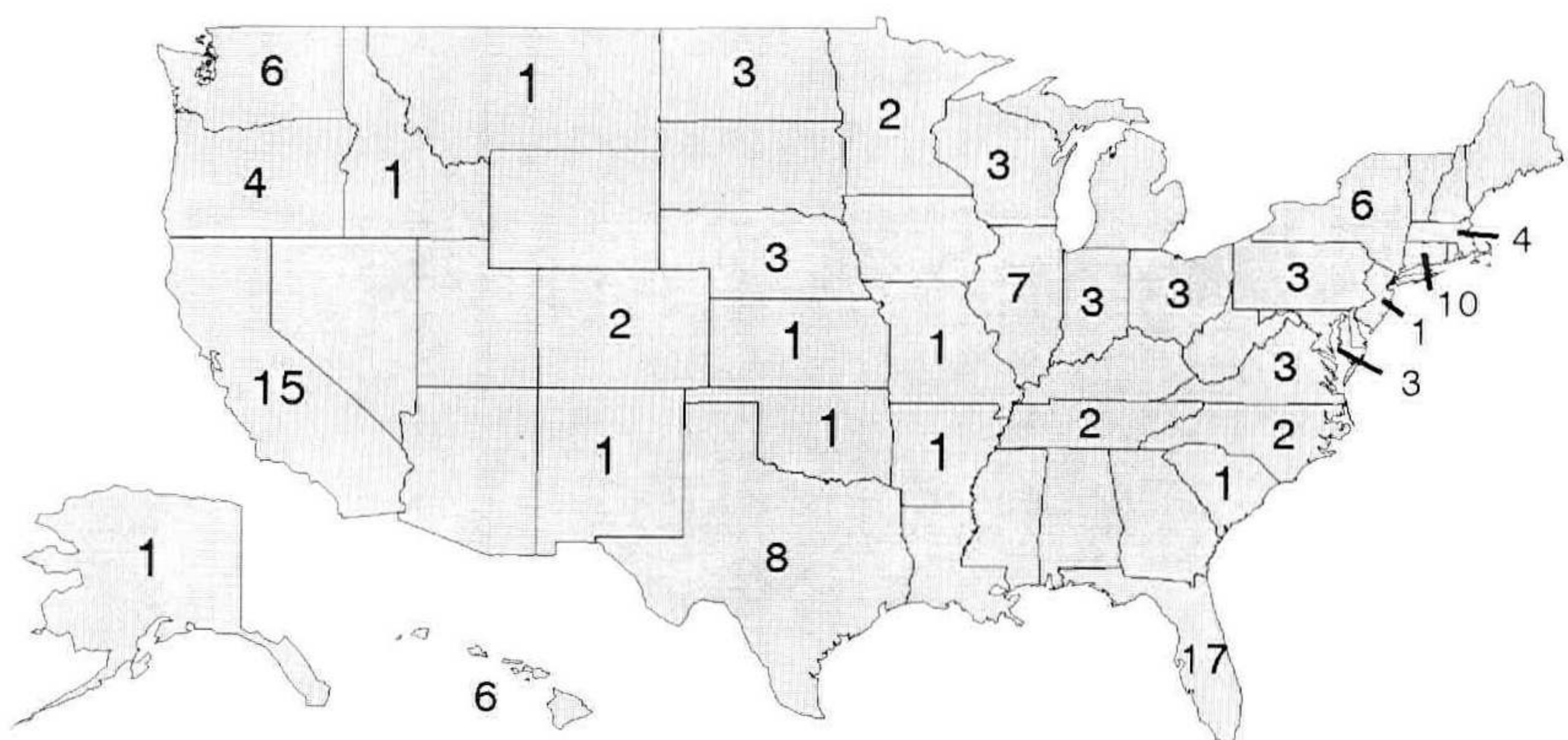
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In 1987, it was reported that there were over 250 commercial plant tissue culture laboratories in the United States (Jones, 1987). However, there has been no comprehensive list of plant tissue culture laboratories published in the United States.

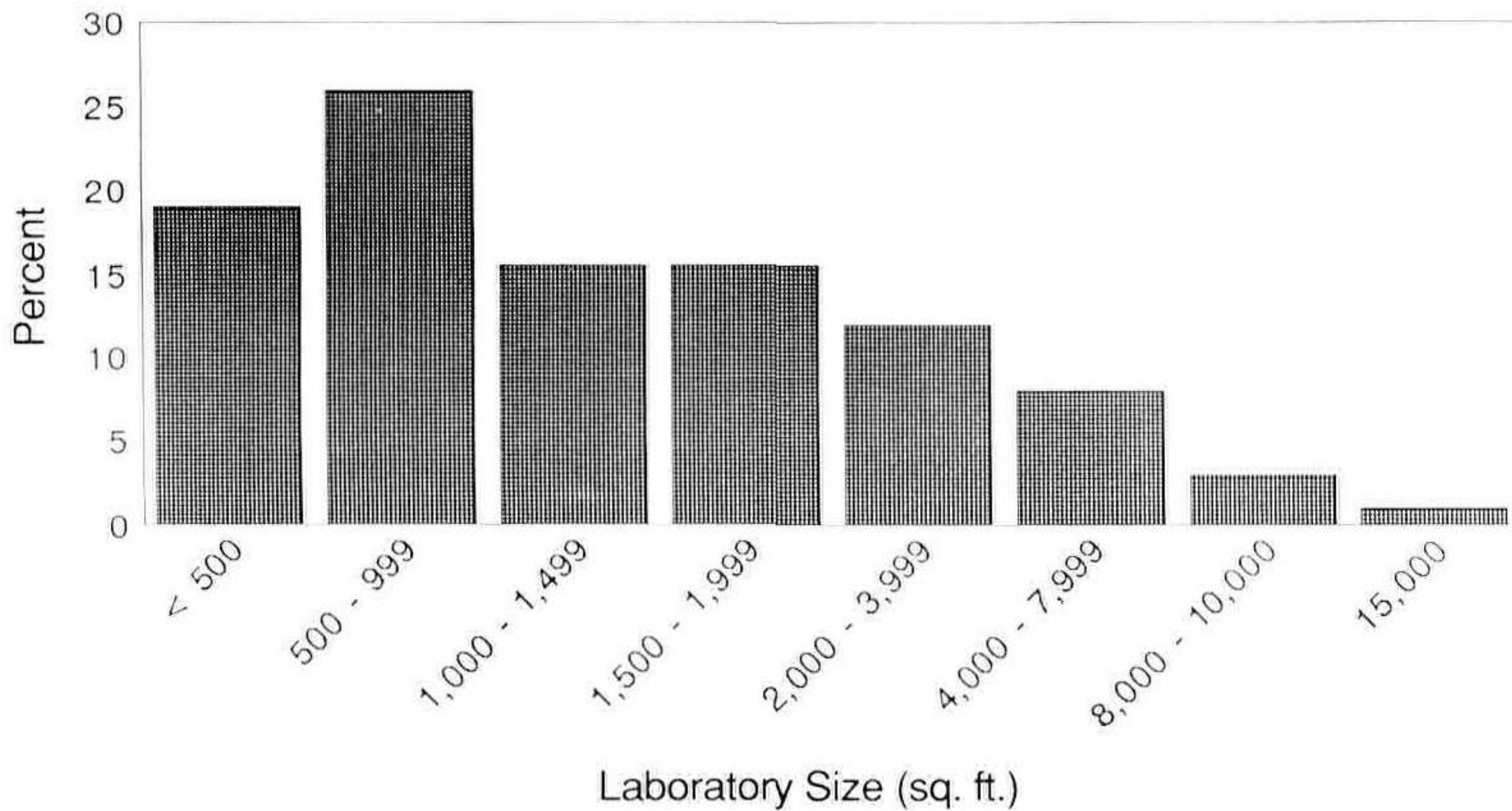
The U.S.D.A. is currently trying to tabulate an accurate estimate of the value of the U.S. horticulture industry. As the micropropagation industry is a major part of U.S. horticulture, it is valuable to know the economic impact from the plants produced in vitro. Before economic information can be gathered, the size of the plant tissue culture industry needs to be known. In order to achieve this goal, we started to tabulate a list of laboratories in the United States, Canada, and Mexico. This compilation will be published as "The Directory of Plant Tissue Culture Laboratories in North America" (Bridgen, 1993). The objective of the Directory was to collate a directory of private and public plant tissue culture laboratories in North America which are involved in commercial production, research, and teaching. Collectively, there is a vast pool of information and skills available in plant tissue culture.

The knowledge and skills required to expand this unique industry requires communication and the directory is a good communication source. The information collated in the Directory will be used to further the support for and the growth of plant tissue culture.

In order to inform laboratory owners and managers of the directory and to invite them to participate in the survey, a questionnaire was placed in professional and

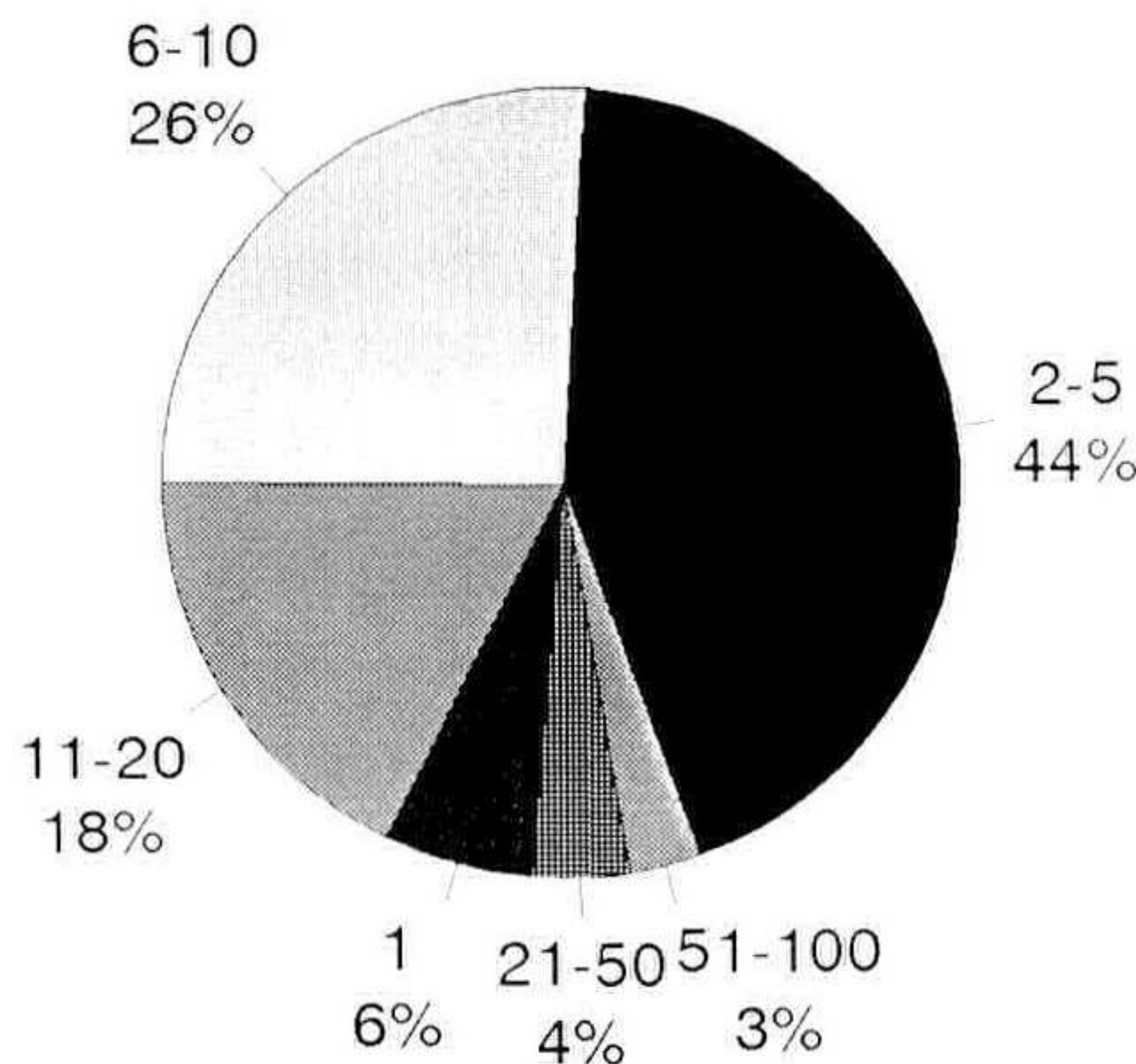


**Figure 1.** Plant tissue culture laboratories in the United States.

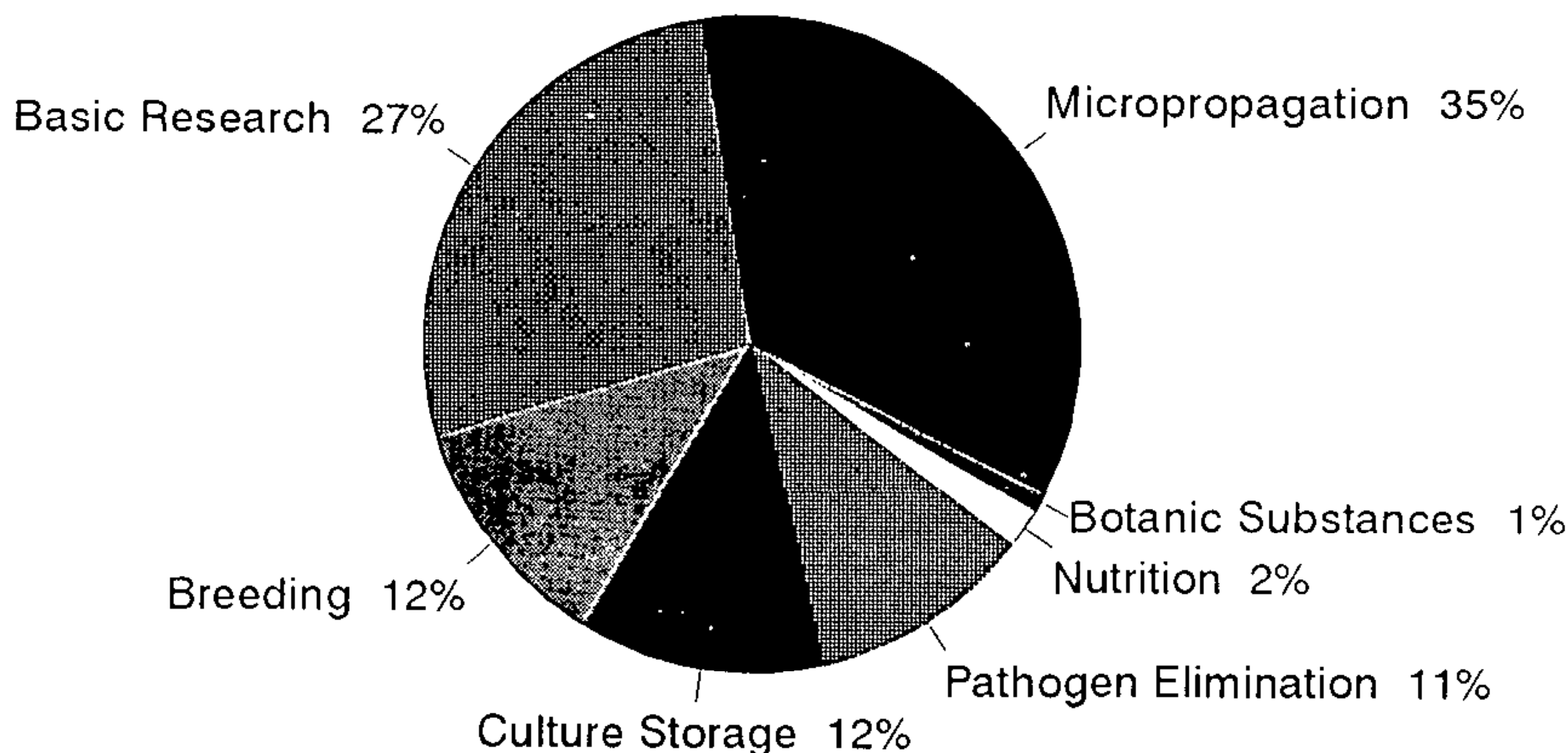


**Figure 2.** Size distributions of plant tissue culture laboratories in the United States.

industry magazines and newsletters of the horticulture and tissue culture industries. There was no charge to be placed in the directory and responses were completely voluntary. The questionnaire requested the name, address, telephone number, and FAX number of the laboratory and the name of the director or owner. Laboratories were categorized as either private or public; the latter was further subdivided into university or government. Private laboratories could be classified as research and development (R&D), commercial production, or hobby; public laboratories were either research or teaching. An attempt to determine laboratory size was made by asking for the approximate square feet, number of plants produced per year, and number of full-time and part-time employees. Twelve laboratory interests and specialties were listed. Those answering the survey were to indicate the interests or specialties that applied to their laboratory by marking



**Figure 3.** Frequency distributions of the total number of employees working in U.S. plant tissue culture laboratories.



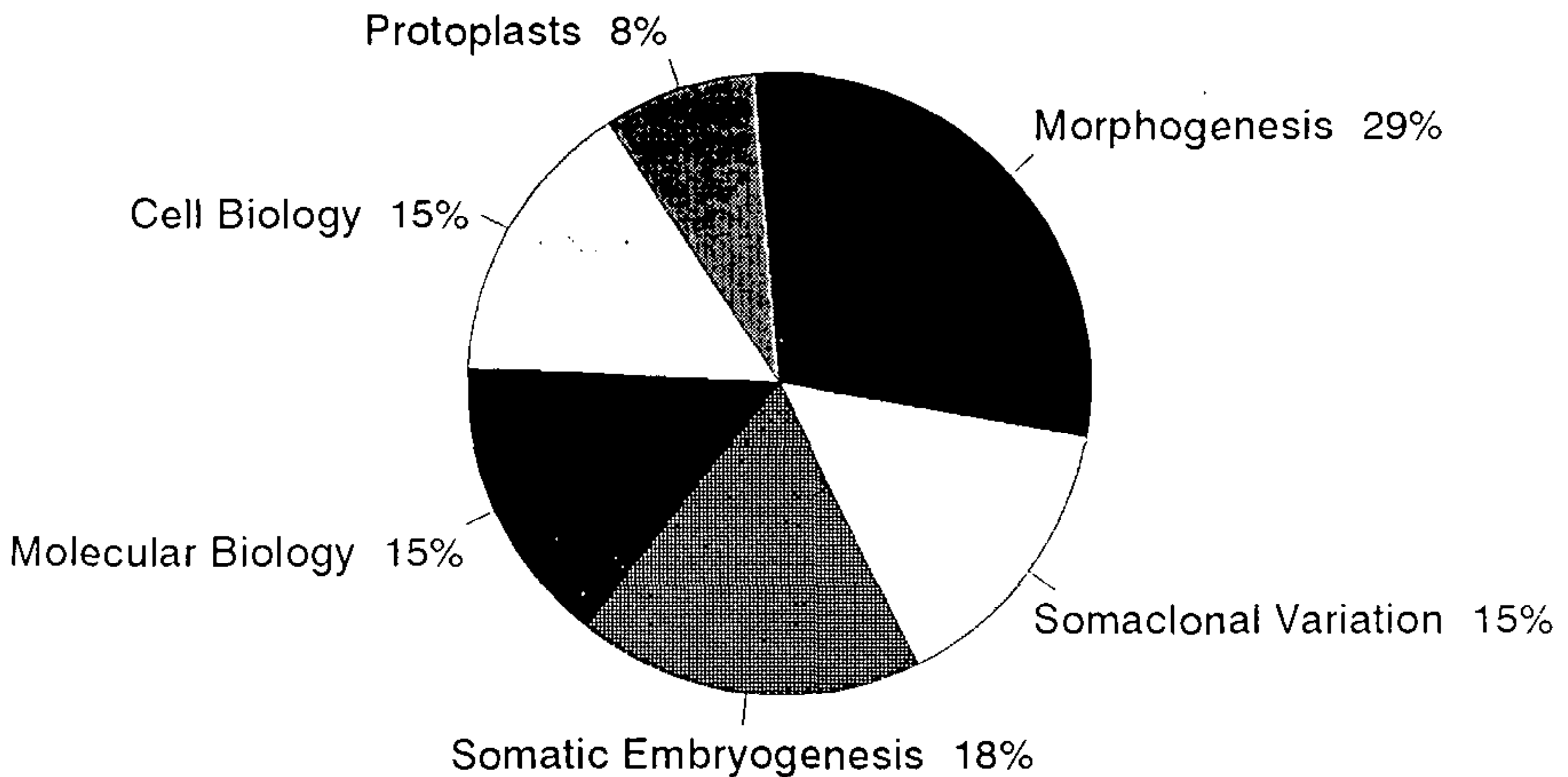
**Figure 4.** Frequency distributions of laboratory specialties in the U.S.

a "1" next to the specialty if methods were perfected or a "2" if methods are under development. The species of plants were also to be named next to the specialty area where appropriate.

There were 125 laboratories from 32 states which responded to the questionnaire. Figure 1 shows the number of laboratories responding from each state. The 1987 survey stated that the majority of commercial ornamental plant tissue culture laboratories in the U.S. were in California, Florida, Texas, and New York. The top states in this survey were Florida (17), California (15), Connecticut (10), Texas (8), Illinois (7), and Hawaii, Washington, New York (each with 6). Of the responding laboratories, 53% were private, 42% were public university laboratories, and 5% were government laboratories. Of the private laboratories 58% were commercial, 35% were R&D, and 7% hobby. Of the university laboratories 56% were research and 44% were teaching; 90% of the government laboratories were research. Only 22 laboratories responded from Canada; 11 were government, 6 were public university, and 5 were private.

Laboratory sizes in the U.S. ranged from as large as 15,000 ft<sup>2</sup> to 100 ft<sup>2</sup>. Figure 2 shows the percentages of laboratories for each of the sizes. The majority of laboratories responding (26%) were between 500 and 999 ft<sup>2</sup>. The largest laboratories were located in Florida (15,000, 10,000, and 2 with 4,000 ft<sup>2</sup>), North Carolina (10,000 ft<sup>2</sup>), California (7,500 and 4,000 ft<sup>2</sup>), Tennessee (5,000 ft<sup>2</sup>) and Washington (2 with 5,000 ft<sup>2</sup>). The largest laboratory in Canada is 10,000 ft<sup>2</sup> and the smallest is 200 ft<sup>2</sup>.

Laboratory size could also be viewed by looking at the number of employees. Of the laboratories responding, 6% had 1 employee, 44% had 2 to 5 employees and 26% had 6 to 10 employees (Fig. 3). If the number of full-time employees per laboratory was further broken down, 21% had 1, 48% had 2 to 5, 17% had 6 to 10, 8% had 11 to 20, and 3% had 51 to 100 full-time employees. Of the laboratories with part-time employees, 14% had 1, 66% had 2 to 5, 12% had 6 to 10, 6% had 11 to 20, and 2% had 21 to 50 part-time employees.



**Figure 5.** Frequency distributions of basic research programs in U.S. plant tissue culture laboratories

Attempts to identify gender relationships in the responding laboratories were made by examining the names of the laboratory owners and managers. Of the respondents in the U.S., 72% were male and 28% were female. In Canada, 69% were male and 31% were female.

Interests and specialties are difficult to exactly quantify since many laboratories had more than one interest. However, the leading specialty was micropropagation with 35% (Fig. 4). After micropropagation came the group of "basic" research programs which included somaclonal variation, morphogenesis, protoplasts, cell biology, molecular biology, and somatic embryogenesis (Fig. 5). Following basic research, breeding and culture storage were the next largest categories, each with 12%, and pathogen elimination had 11% of the total interest.

Plant tissue culture businesses continue to be misrepresented and misunderstood by economic tabulators. As the value of horticulture has been underestimated in the past when it was "clumped" under the general category of "agriculture", the value of plant tissue culture is currently underestimated. Not until businesses are clearly identified and the products and value of the products are outlined will the industry be fully appreciated. This survey is just the beginning of a lengthy evaluation process.

#### LITERATURE CITED

- Bridgen, M.P.** 1993. Directory of plant tissue culture laboratories in North America. University of Connecticut, U-67, Storrs, Connecticut.
- Jones, J.** 1987. Commercial plant tissue culture in the United States. *Acta Hort.* 212:639-643.

#### TUESDAY MORNING 1 DECEMBER 1992

The morning session was reconvened at 10:30 a.m. with Tom McCloud serving as Moderator.