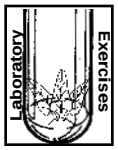
Introduction to the Workshop

Mark P. Bridgen[1]



Instructors of plant tissue culture classes always are looking for new laboratory exercises. However, developing new exercises with plants other than *Nicotiana* and *Daucus* can be unsuccessful and time-consuming. In addition, instructors have to take into consideration the expectations of students, teaching assistants, and administrators. Instructors want laboratories that are reliable, can be completed within one semester, meet objectives valuable to the course, familiarize students with specific skills, have sufficient background information, and do not have lengthy planning and preparation. Administrators, during these times of budget cuts, would like exercises to be inexpensive. Teaching assistants prefer laboratories that are implemented easily and outlined in detail to decrease confusion and keep laboratory reports short. Finally, the students want laboratories that are valuable, easy to follow, and clearly and concisely described; it also would be nice to have a plant or culture of their own to take home.

Six seasoned instructors and authorities of plant tissue culture participated in this 1993 ASHS workshop. A description of plant regeneration from an axillary shoot proliferation system of *Ajuga reptans* is presented by John Preece. This exercise is unique, easy to implement, and demonstrates the four stages of micropropagation, the effects of cytokinin concentrations, and the differences between adventitious and axillary shoots.

For those instructors looking for a very unique in vitro sexual micropropagation exercise, Kenneth Mudge reviews a procedure for the asymbiotic seed germination, subculture, and outplanting of orchids. The exercise can be used to instruct students about orchid reproductive biology and symbiosis, as well as the skills involved in orchid seed sterilization and culture. Although scheduling the plants to flower and set seed is rather lengthy for the instructor, the detailed schedule is presented for stock plant flower pollination, capsule harvest and sowing, and seedling subculture.

Michael Kane provides an exercise that demonstrates both direct and indirect shoot organogenesis from internodes of *Myriophyllum aquaticum*. *Myriophyllum* is a plant that responds quickly in vitro and is easy to establish, grow, and store on agar-solidified medium.

Mark Bridgen presents another laboratory exercise to demonstrate direct and indirect organogenesis, but, in this procedure, organogenesis arises from leaf explants of *Torenia fournieri*. The in vitro production of adventitious shoots from *Torenia* is easy to control, seeds are inexpensive and easy to obtain, and plants are easy to grow. The laboratory also allows modifications to learn about where callus originates on the explant, if abaxial or adaxial surfaces affect organogenesis, and what effect the size of the explant has on organogenesis.

For those instructors who are bored with carrot somatic embryogenesis, Dennis Gray supplies an exercise for somatic embryogenesis of *Dactylis glomerata*. The exercise leads students through aspects of culture initiation, maintenance, and plant regeneration. This project with orchard grass not only demonstrates an interesting plant tissue culture procedure, it also helps to relate to the students the practical and economical importance of cell culture.

Finally, for those instructors that want a little more "biotechnology" in their classes, Robert Trigiano presents a versatile laboratory on the transformation and organogenesis of a popular floricultural species—*Dendranthema grandiflora*. Not only does the laboratory illustrate organogenesis and transformation, but the protocol explains five variations that can be used to demonstrate other concepts.

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A Laboratory Exercise for Axillary Shoot Proliferation using *Ajuga reptans*

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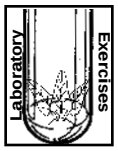

Additional index words. adventitious shoots, herbaceous perennial, in vitro, micropropagation, teaching, tissue culture

Summary. This exercise was developed for a plant propagation course to demonstrate, in a short time, the four stages of micropropagation, the effects of cytokinin concentrations, and the differences between adventitious and axillary shoots. Greenhouse-grown stock plants were brought into the laboratory, and 4- to 5-cm-long tips of runners were surface-dis-infested for 15 min in 0.5% NaClO with 1 ml of Tween 20/liter, followed by two 5-min rinses in sterile water. Working in the open laboratory near the bases of pairs of lit Bunsen burners, students placed either single-node or shoot tip explants (2 cm long, five replications) onto MS medium with 0, 1, or 10 µM BA. Cultures were in-cubated in parafilm-sealed culture tubes on open laboratory benches. Axillary shoots grew regardless of concentration of BA, and explants on medium with 10 µM BA produced the most callus and adventitious shoots. Microshoots were rooted and ac-climatized under mist in the greenhouse. This exercise can be performed in an open laboratory without the use of laminar flow hoods, specialized sterilizing equipment, or supplemental lighting.

For several years, we were looking for a sufficiently rapid micropropagation laboratory exercise for a plant propagation course to demonstrate axillary shoot proliferation, rooting, and greenhouse acclimatization of plants. Based on time con-

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