length, and mass) would be sufficient for commercial production if the clones were released to industry. Cuttings were taken from 24 clones at 3 developmental stages of stem growth (softwood, semi-hardwood and hardwood). Three concentrations of K-IBA were tested (0, 7500, and 15,000 mg·L^{-1}) on each clone at each stage. Rooting percentages ranged from approximately 94% (clone MX1MD33) at the softwood stage to 0% for several clones at the hardwood stage. Some clones, such as MX5MD17 rooted at 88% and 83% in the softwood and semi-hardwood stages, respectively, while others such as 479-16 rooted at low levels (< 20%) in all stages. In some cases, significant ($P \leq 0.05$) interactions occurred between growth stages and clones, such as that exhibited by clone 492-14 which rooted at 59% at the softwood stage but only 37% at the semi-hardwood stage. Root number and length exhibited three way interactions ($P \leq 0.05$) among clones × developmental stages × K-IBA concentrations. For example, mean total root length ranged from 2 cm per cutting on MX2MD31 at the semi-hardwood stage with no hormone to 81 cm per cutting on TX8DD38 at the softwood stage with 7500 mg·L^{-1} K-IBA. Mean root length varied from 2 cm found in several clones at the semi-hardwood stage to 11 cm on MX2MD31 at the softwood stage treated with 15000 mg·L^{-1} K-IBA. Most frequently, the greatest rooting percentages across K-IBA concentrations for clones were at the softwood stage and across rooting stages for most clones were at either 7500 or 15000 mg·L^{-1} K-IBA. None of the clones rooted well as hardwood cuttings and 15000 mg·L^{-1} sometimes induced basal stem damage.

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11:30–11:45 am

Micropropagation of *Ilex glabra* (L.) A. Gray

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Inkberry (*Ilex glabra* (L.) A. Gray) is a popular native evergreen shrub with glossy green foliage for ornamentals. To mass produce inkberry for the nursery market, nodal segments containing one axillary bud (1–1.5 cm) were disinfested using 10% bleach and established on MS medium without hormone at 27 °C and 16 h photoperiod. The sprouted shoots (~1.0 cm) were cultured on MS medium supplemented with 6-Benzyl Aminopurine (BAP), Kinetin (KT) or Zeatin (ZT) at 0.5, 1.0, 2.0, or 4.0 mg·L^{-1}. After 38 days, BAP and ZT significantly induced multiple shoot formation with multiplication rates of 4-6, while the multiplication rate of KT was less than 2. Shoots cultured on ZT grew significantly faster than that of BAP and KT. The height of the longest shoots treated with ZT was 4.6 cm, which was 1.6-2.2 times greater than those treated with BAP or KT. =To induce rooting, shoots (~ 2 cm) were subcultured on ¼ strength MS medium containing either IBA or NAA at 0.5, 1.0, or 2.0 mg·L^{-1}. Adventitious roots formed after 3-4 weeks in cultivation. IBA, at 1.0 or 2.0 mg·L^{-1}, produced the best rooting compared to other treatments. After 38 days, 66.7% and 100% of shoots were rooted at 1.0 and 2.0 mg·L^{-1} IBA, respectively. The average number of roots per shoot was about 15, which was 1.6–3.1 times as much as that of other treatments. All rooted plantlets were then transplanted into a mix of peat moss: perlite (1:1 v/v) and acclimated in a mist system. About 73.6% of the plantlets survived after grown for 35 days. This micropropagation procedure could be used for commercial mass production of newly bred inkberry cultivars.

11:45 am–12:00 pm

In Vitro Regeneration of Venus Fly Trap (*Dionaea muscipula* Ellis) from Leaf Explant

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Dionaea muscipula Ellis commonly known as Venus fly trap is an important carnivorous plant with medicinal importance. It contains certain secondary metabolites like naphthoquinones and is used in anti-aids and anti-cancer drugs and other medicines called as "Carnivora". Increasing interest and use as an ornamental and medicinal plant and have put it in an endangered state. Development of in vitro techniques for the preservation of germplasm that is on the brink of extinction is highly demanded. A regeneration protocol for the multiplication and micropropagation of *Dionaea muscipla* Ellis was established. In vitro regeneration potential of leaf explants in different concentrations and combinations of plant growth substances was investigated in this study. Leaf disc explants were excised and cultured under aseptic conditions on nutritional medium containing half strength Murashige and Skoog (MS) mix with combinations of 1.0-20.0 μM BA, 2.5.0 μM IBA, 1.0-10.0 μM 2iP and 0.1-0.5 μM TDZ. The cultures were kept in growth cabinet with cool white light (40-60 m·mol·m^{-2}·s^{-1}) under 16-h photoperiod. Regeneration was recorded after 60 days with the intervals of 15 days based on the degree of shoot organogenesis and somatic embryogenesis. 1/2 MS + 0.1 TDZ appeared to be efficient for somatic embryogenesis and simple 1/2 MS for direct shoot organogenesis. 1/2 MS combined with 2iP appeared to be efficient for regeneration either by direct shoot organogenesis or by somatic embryogenesis. Plants were rooted well in Cape Cundew medium and all of the plants were acclimatized and survived in greenhouse conditions. These investigations will aid in the development of a model system for clonal mass propagation and in vitro regeneration of *Dionaea muscipla* Ellis.

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Oral Session 21: Teaching Methods 2 — Lewis
Tuesday, 28 July 2009, 8:00–9:00 am

Moderator: Tina Marie Waliczek, tc10@txstate.edu

8:00–8:15 am

Use of Virtual Field Trips to Enhance the Educational Experience

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Field trips are an important component of many horticulture courses. Daytime field trips to botanical gardens, arboretums, nurseries, greenhouses, and other horticulture operations are difficult to schedule and many students are not able to attend due to scheduling conflicts. Furthermore, as more courses are developed for on-line (web) delivery, we lose the opportunity to show students real-world examples via the field trip. The development of Virtual Field Trips (VFT) using DVD video as a course aid would enable those students that do not have