

and dense growth habit. To our knowledge, the exact light conditions required to promote these characteristics have not been determined. Therefore, two cultivars of coleus, 'Kong Red' and 'Wizard Coral Sunshine', were grown under four daily light integrals (DLI) (10.0, 5.8, 3.8, and 2.9 mol·m⁻²·d⁻¹) to determine the optimal light level for production. 'Kong Red' and 'Wizard Coral Sunshine' coleus grown under a DLI of 2.9 mol·m⁻²·d⁻¹ exhibited reduced leaf areas of 66% and 63%, respectively, compared to those grown under a DLI of 10.0 mol·m⁻²·d⁻¹. The number of leaves per plant followed the same trend, decreasing 64% in both cultivars when comparing those produced under the lowest and highest DLI treatments. Percent non-green area per leaf decreased by 18% for 'Kong Red' and by 23% for 'Wizard Coral Sunshine' produced under 2.9 mol·m⁻²·d⁻¹ compared to plants grown under 10.0 mol·m⁻²·d⁻¹. Overall, both cultivars exhibited a more dense growth habit and greater degree of variegation (relative percent of non-green area per leaf) when grown under the highest DLI. Therefore, we recommend growing these two cultivars under a minimum DLI of 10.0 mol·m⁻²·d⁻¹.

Specified Source(s) of Funding: Maine Agricultural Center Integrated Research and Extension Grant

(176) Several Factors Affecting In Vitro Mass Propagation and Morphogenesis in Prothalli of *Pteris cretica* Wilsonii

Ju Kwang Hwang*

Chungbuk Natl University, Cheongju, Chungbuk; jkhwang@chungbuk.ac.kr

S.L. Shin

Chungbuk Natl University, Cheongju, Chungbuk; sorim0917@hanmail.net

Daeil Kim

Chungbuk Natl University, Cheongju, Chungbuk; dkpomo@chungbuk.ac.kr

C.H. Lee

Chungbuk Natl University, Cheongju, Chungbuk; leech@chungbuk.ac.kr

Present studies were undertaken to establish the mass propagation systems by examining adequate environmental conditions for culturing prothalli of *Pteris cretica*. Chopped prothalli were inoculated on 3 kinds of medium: 1/8, 1/4, 1/2, 1, and 2X MS with 3% sucrose and 0.8 agar, 0.3% Hyponex (N:P:K = 6.5:6:19), and Knop medium. The multiplication and growth of prothalli was highest with Hyponex medium. To see the effects of sucrose concentrations prothalli were again inoculated on Hyponex and MS medium containing 0 ~ 5% sucrose, and the highest growth was obtained with Hyponex with 1% sucrose. Most prothalli did not survive on MS medium containing sucrose, but in some prothalli the formation of parenchyma tissues, not gemmae, was observed. Divided in groups or chopped prothalli were placed on 3 media and results showed that division was better with MS, whereas chopped was with Hyponex. The agar concentration of 0.6% was most effective in prothallus multiplication. Solid and liquid medium (stationary or shaking) were employed in this experiment and solid medium proved to be effective in prothallus multiplication. The prothalli continued to multiply by the formation of gemmae in liquid shaking culture, but in solid culture parenchyma tissues were formed. This indicates that liquid shaking culture might be preferred for prothallus proliferation if cultured more than 8 weeks. In conclusion, solid culture should be used if the sporophyte formation by prothalli is wanted, but if mass propagation of prothalli is desired, liquid shaking culture is favored even if it takes longer time.

Specified Source(s) of Funding: Chungbuk National University, Korea

(177) Target Region Amplification Polymorphism (TRAP) for Evaluating Genetic Diversity in *Malus* Mill. Genus

Ling Guo*

Beijing Botanical Garden, Beijing 100093; lingguo27@hotmail.com

Rose Palumbo

The Ohio State University, Columbus, OH; palumbo.27@osu.edu

Zuoshuang Zhang

Beijing Botanical Garden, Beijing; zhangzuoshuang@beijingbg.com

Guo-liang Wang

The Ohio State University, Columbus; wang.620@osu.edu

David Tay

International Potato Center, Lima; d.tay@cgiar.org

Donglin Zhang

University of Maine, Orono, ME; donglin@maine.edu

Xiang Shen

Shandong Agriculture University, Tai'an; shenx@sdau.edu.cn

Huirui Shu

Shandong Agriculture University, Tai'an; hrshu@sdau.edu.cn

Malus belongs to Rose family and has 8-55 (78) species depending on various classification systems. Also, many synonyms and homonyms were existed. There are more than 7500 apple cultivars and more than 500 flowering crabapple cultivars in the world. Most of them were bred by open pollination and a few of them were controlled crosses. TRAP (Target region amplification polymorphism) was applied for elucidating genetic relationships in *Malus* genotypes. TRAP is a novel PCR-based molecular marker technique which uses gene-based information for primer design. 43 *Malus* samples from 27 species and varieties, 8 hybrid species, and 8 cultivars were selected for TRAP maker system analysis. Two fixed primers, designed using matK gene sequences of *Malus sieboldii*, paired with two arbitrary primers, were used to conduct TRAP PCR. A UPGMA dendrogram was generated based on a total of 197 unambiguous bands. Among them, 182 were polymorphic with an average of 45 polymorphic bands per primer combination. The bands ranged in size from 75 to 700 bp. TRAP PCR cluster analysis revealed that the closer relationships in the dendrogram of *Malus* samples are in agreement with the originations of these genotypes. TRAP is a potentially useful marker technique for genetic diversity studies in *Malus* genus.

(178) Ornamental Peppers for the Gulf States

William Evans

Mississippi State University, Crystal Springs, MS; wbe@ra.msstate.edu

Yan Chen*

Louisiana State University, Hammond, LA; yachen@agcenter.lsu.edu

Crofton Sloan

Mississippi State University, Verona, MS; csloan@ext.msstate.edu

Susan Harkness

Mississippi State University, Verona, MS; ssh@ra.msstate.edu

This study investigated the garden performance of ornamental pepper (*Capsicum* sp.) cultivars at Hammond, Louisiana, and at Crystal Springs and Verona, Mississippi, over two years. Over thirty entries were evaluated in replicated plot at each location, with more than twenty-five entries common to all three locations. The trial was of smaller fruited peppers, not *C. annuum* bell-type peppers. Each plot was rated on a one to five scale monthly over the three to four month growing season for plant shape, uniformity, attractiveness of fruit, attractiveness of foliage, and overall garden performance. Cultivar performance varied across sampling dates within location. Across locations, cultivars often received similar ratings. Among the higher rated cultivars, ones that