Separation of Tetraploid and Diploid Plants from Chimeras in *in vitro* Cultures of Purple Coneflower (*Echinacea purpurea* L.)

Dahanayake Nilanthi[1, 2], Xiao-Lu Chen[1], Fu-Cheng Zhao[1], Yue-Sheng Yang[1, 2] and Hong Wu[2]

[1]*Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka*
[2]*Genetic Engineering Laboratory, College of Life Sciences, South China Agricultural University, Guangzhou 510642, P R China*
[3]*Research Center of South China Medicinal Plants, South China Agricultural University, Guangzhou 510642, P R China*

Abstract

In general, mutated cells are difficult to monitor but mutations which result in a change in genome number are an exception and genome number mutations can be identified by chromosome counting. In the present study, chimeric materials were used as explant source, and higher percentages of tetraploid shoots were induced from explants with higher ratio of tetraploid cells to diploid cells; explants possessing 26% tetraploid cells regenerated 10% tetraploid plants, explants possessing 15% tetraploid cells regenerated 4% tetraploid plants, and explants possessing 11% tetraploid cells regenerated 2% tetraploid plants. The reliability of the tetraploid nature of the regenerated plants, directly from colchicine treated culture and from chimeric materials was confirmed by regenerating buds again from explants of these plants, and amongst the six plants tested, five were confirmed to be true tetraploids that regenerated 100% tetraploid plants, and the rest one to be a chimera which regenerated 93% tetraploid plants. Results of the experiments indicate that *in vitro* culture method could provide a useful way to separate chimeras into individuals with one of the component cell genome numbers, and by this it could produce 100% pure tetraploids from chimera plants for further genetic studies of *Echinacea purpurea* L and for direct agricultural application.

Keywords: chimera, chromosome, purple coneflower, regeneration, tissue culture