

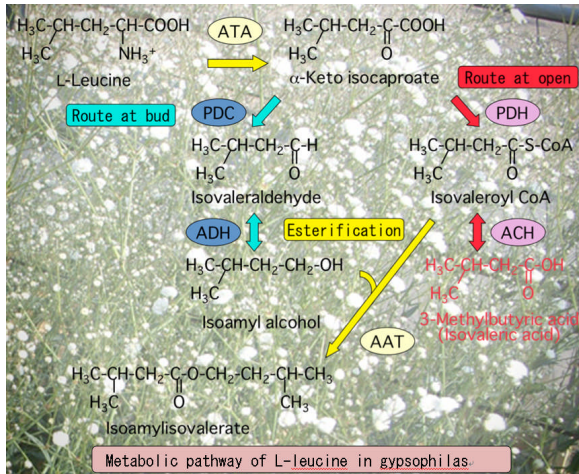
## DETECTING THE POTENTIALITY OF THE VEGETABLES & FLOWERS

### Lab. Vegetable & Ornamental Horticulture

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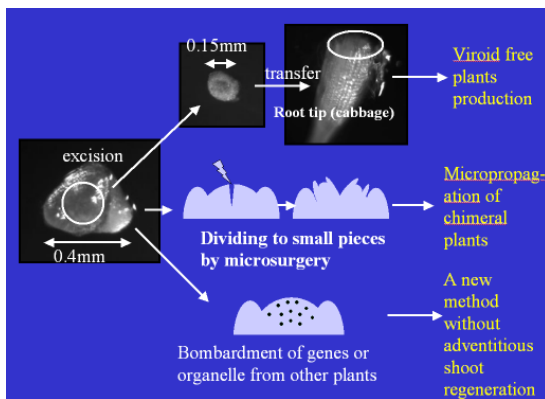
Vegetables and flowers are indispensable for a healthy human life. For the supply of good-quality and safe products at a low price all the year round, we need to develop efficient plant production systems (as well as crops themselves) depending on basic research.

### Production of fragrant flowers



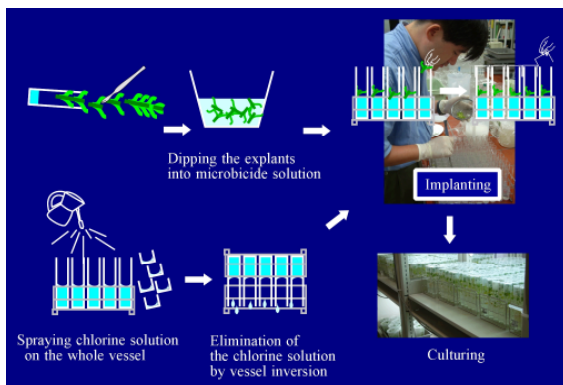
Anyone who encounters beautiful flowers feels like sniffing them. However, those flowers rarely have a favorable scent, and do not heal our hearts. Considering the flower sent as one of the important quality elements, we have been studying how we could change it favorable genetically and chemically. For example, perennial gypsophila inflorescences have an unpleasant odor, emitting isovaleric acid, a compound responsible for the sweat smell of human beings. Isovaleric acid is esterified by application of a certain kind of alcohol, resulting in weakening of the unpleasant odor. Thus, we can obtain cut gypsophilas having a pleasant scent by perfuming them thereafter with monoterpenoids.

### New Technology development using shoot apical meristems



Shoot apical meristems (SAMs) are composed of hundreds of new-born cells and are very attractive tissues for horticulture. First, we can produce viroid-free plants using a newly developed method, because virus and viroid cannot invade the tips of SAMs. Second, a microsurgery method is useful for in vitro propagation of periclinal chimeric plants which are difficult to propagate by ordinal methods. Third, introduction of genes to SAMs will become a versatile method for transgenic plant production.

### Plant tissue culture in a non-aseptic room



Medium containing sucrose monolaurate and several mg of chlorine per liter is sterilized by boiling without autoclaving. By coating the vessels and the explants with a solution containing chlorine and sucrose monolaurate, the explants can be cultivated under non-aseptic conditions (office-space clean level) without microbial contamination. Microbial contamination can be extremely reduced by using a pesticide and food additive having bacteriostatic action. Moreover, the explants grow better than those by conventional methods using autoclaved medium and a clean bench.

## Keywords

*Gypsophila, Chrysanthemum, Saintpaulia, Pepper, Taro, Breeding, functional compounds, Shoot apical meristem, Tissue culture, Quality control, Flower color, Aromatic compounds, Chlorine, Mass propagation*

## Recent Publications(1)

**Defense response of a pepper cultivar cv. Sy-2 is induced at temperatures below 24° C.**

Koeda, S., M. Hosokawa, B. C. Kang, C. Tanaka, D. Choi, S. Sano, T. Shiina, M. Doi and S. Yazawa(2012)  
J. Plant Res. 125: 137-145.

**Three acylated anthocyanins and a flavonol glycoside in violet-blue flowers of *Saintpaulia* 'Thamires'.**

F. Tatsuzawa, M. Hosokawa, N. Saito and T. Honda(2012)  
S. Afr. J. Bot. 79: 71-76.

**A bHLH transcription factor, *DvIVS*, is involved in regulation of anthocyanin synthesis in dahlia (*Dahlia variabilis*).**

Ohno, S., M. Hosokawa, A. Hoshino, Y. Kitamura, Y. Morita, K. I. Park, A. Nakashima, A. Deguchi, F. Tatsuzawa, M. Doi, S. Iida and S. Yazawa(2011)  
J. Exp. Bot. 62: 5105-5116.

**Characterization and genetic analysis of a low-temperature-sensitive mutant, *sy-2*, in *Capsicum chinense*.**

An, S. J., D. Pandeya, S. W. Park, J. Li, J. K. Kwon, S. Koeda, M. Hosokawa, N. C. Paek, Choi, D. and B. C. Kang(2011)  
Theor. Appl. Genet. 122: 459-470.

**Determination of the origin of vigorous shoots generated from particle-bombarded chrysanthemum shoot tips.**

Hosokawa, M., S. Hisanao and F. Takashi and M. Doi(2011)  
J. Japan. Soc. Hort. Sci. 80: 461-468.

**Simultaneous post-transcriptional gene silencing of two different chalcone synthase genes resulting in pure white flowers in the octoploid dahlia.**

Ohno, S., M. Hosokawa, M. Kojima, Y. Kitamura, A. Hoshino, F. Tatsuzawa, M. Doi and S. Yazawa(2011)  
Planta 234: 945-958.

## Recent Publications (2)

**Somaclonal variation is induced *de novo* via the tissue culture process: A study quantifying mutated cells in *Saintpaulia*.**

Sato, M., M. Hosokawa and M. Doi(2011)

PLoS One 6: e23541 DOI:10.1371/journal.pone.0023541.

**Tissue culture-induced flower-color changes in *Saintpaulia* caused by excision of the transposon inserted in the *flavonoid 3', 5'hydroxylase (F3'5'H)* promoter.**

Sato, M. , T. Kawabe, M. Hosokawa, F. Tatsuzawa and M. Doi(2011)

Plant cell Rep. 30: 929-939.

**A protocol for preparing preserved flowers with natural color and texture.**

Ito. H., T. Hayashi, M. Hashimoto, K. Miyagawa, S. Nakamura, Y. Mizuta and S. Yazawa(2010)

Hort Technol. 20: 445-448. 2010.

**Increase in the number of decorative florets in the inflorescence of *Hydrangea* through phytoplasma infection.**

Kitamura, Y., M. Hosokawa, T. Uemachi and S. Yazawa(2010)

Sci. Hort. 124: 134-138.

**Newly mutated putative-aminotransferase in nonpungent pepper (*Capsicum annuum*) results in biosynthesis of capsinoids, capsaicinoid analogues.**

Tanaka, Y., M. Hosokawa, T. Miwa, T. Watanabe and S. Yazawa(2010)

J. Agric. Food Chem. 58: 1761-1767.

**Novel loss-of-function putative aminotransferase alleles cause biosynthesis of capsinoids, nonpungent capsaicinoid analogues, in mildly pungent chili peppers (*Capsicum chinense*).**

Kobata, K., T. Todo, S. Yazawa, K. Iwai, and T. Watanabe(2010)

J. Agric. Food Chem. 58: 11762-11767.

**Secondary cell walls at a scarious floral leaf in several plant species including *Helichrysum bracteatum*.**

Ito, H., K. Nishikawa, T. Awano, M. Hosokawa and S. Yazawa(2010).

Horticultural Reseach 9: 19-23.

**Developmental abnormality of a local pepper cultivar (*Capsicum chinense*) from the Seychelles below 24°C**

Koeda S., A. Takezaki, Y. Isomura, and S. Yazawa. (2010)

Bulletin of Experimental Farm Kyoto University 19:15-20.