

Biotechnology in Ornamental Horticulture

IN ornamental horticulture use of plant cell and tissue culture, recombinant DNA technique, antisense RNA technology, genetic engineering using *Agrobacterium* and protoplast fusion techniques has become important. Ornamental crops may be improved to produce novel types with rarer flower colours and other desirable attributes. Rapid propagation of these new clones can then be done by micropropagation.

Tissue and cell culture systems

The commercially important genotypes of ornamental plants are tissue cultured by nurserymen to provide planting material in bulk. A recently developed cultivar can be rapidly multiplied using the technique — it saves labour, time and energy. Micropropagation is much used for mass multiplication of orchards and house plants. Embryo culture techniques are useful in rescuing the progenies obtained from interspecific intergeneric hybridization, generally impossible through conventional methods. This technique also reduces the dormancy period in roses and Iris.

Viruses which destroy a large number of ornamental plants can be prevented by meristem-tip culture for the production of cut-flower crops like carnation and Gladiolus.

Cell-culture systems are also useful in the production of secondary metabolites, a technique much used in perfume industry that utilizes the essential oils present in the cells of fragrant flowers. Rose oil production may be increased since the flowering period is limited in the field.

Somaclonal variations, *in vitro* selection method to use the cellular-level variations, for herbicide-tolerance, salt-tolerance and other biotic- and abiotic-stress tolerance can give better cultivars in much less time than conventional breeding.

A capsule for those newcomers who would like to trade in ornamentals and as yet are beginners in the subject. Biotechnology is a set of handy techniques to choose from, explain the authors.

Enzymological techniques

Enzymes are chemically proteins and biological catalysts in living systems. Restriction enzymes cut the DNA at specific sites. A gardener is always interested in adding a novel colour into his scheme. Molecular biology techniques, which involve the isolation of a gene specific for a character, cutting the gene from host species which has the needed character using restriction enzymes, and insertion of the gene into the desired garden plant species, may be used. In case the character is controlled by many genes, antisense RNA technique, which blocks the other genes, helps to accomplish the goal. This is useful in many economic characters like pigmentation and yield. Restricted fragment length polymorphism (RFLP) is very helpful in identification of rose cultivars.

Ornamentals vs crop species

Genetic engineering and biotechnological methods though commonly applied in crop improvement and multiplication, are extremely expensive. The ornamental plants have many advantages compared to field crop species: since each plant is commercially useful, the cost can be overlooked.

The use of genetic engineering and molecular biology techniques in food crops are sometimes dangerous. There are chances of food toxicity and carcinogenicity.

'Super weeds' is the transmission of desirable characters from transgenic plants in the field to its weed relatives. It is a concept in debate that overcomes the danger to environment by intensive glasshouse cultivation — a practice of limited use in field crops but common in commercial floriculture.

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