Commercialization of genetically modified floricultural crops having novel flower color

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It is rare for a single plant species to have the complete range of flower colors. For example, rose, carnation and chrysanthemum, all of which are important cut flower species, do not have blue/violet-coloured flower varieties, This is because these crops are not able to synthesize the delphinidin-based pigments that blue/violet flowers usually accumulate. Expression of a key gene to synthesize delphinidin in carnation, rose and chrysanthemum has successfully resulted in isolation of varieties with a flower color altered toward blue. As these new varieties are genetically modified it is necessary to obtain applicable permission from each country or area to grow or sell these plants - mainly from the point of view of possible effects on biodiversity.

The flower-color modified transgenic carnations (Moon® series) hardly produce viable pollen and pollination of related *Dianthus* species was not observed. The carnations are produced in Ecuador and Colombia and have been sold in the USA, Japan, EU and other countries for more than 10 years. No effects on biodiversity have been observed.

Cultivated rose (*Rosa* X *hybrida*) is tetraploid whereas most wild roses are diploids. Gene dispersal from the transgenic rose to wild rose under natural condition was not observed. One transgenic rose variety (SUNTORY blue rose APPLAUSE) has been sold in Japan since 2009. Though color-modified chrysanthemum has also been developed, release of transgenic varieties of this species is currently likely to be difficult in Japan since chrysanthemums easily hybridize with their wild species.

In this paper, scientific and regulatory issues related to flower color modification by genetic engineering will be discussed.

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