Graft transformation in tobacco (Nicotiana tabacum)

We have obtained various graft-induced changes and clarified the genetic nature mainly in solanaceous plants, such as red pepper, eggplant, tomato and in soybean. From the similarity of genetic behaviour of the graft-induced changes with that of DNA-mediated transformation in higher organisms, we speculate transformational matter as a probable mechanism of the graft-induced change. In order to check the relationship between transformation and graft-induced change, a graft experiment was performed, in which the transgenic tobacco plant having bacterial Km^R gene closely linked with Nos gene was used as stock plant. The genetic behaviour and fate of the bacterial genes derived from the stock plant were pursued in the progenies from the scion capsules of normal tobacco.

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A method to obtain mutants in outcrossing cucumber

Due to the chimerism within the apical meristem in the seed embryo, seed irradiation is not an efficient method of mutation breeding in the outcrossing cucumber, which develops male and female flowers separately. To solve the problem, the pollen irradiation method was examined, expecting non-chimeric mutant genotypes among the seeds. Pollen irradiated with 1kR to 10kR of gamma rays was used to pollinate the same variety. The M_1 plants were self-pollinated. Examination of these selfed lines revealed several mutants.

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Transfer of the Fusarium resistant gene from Solanum integrifolium into S. melongena by asymmetric fusion

In order to transfer the Fusarium resistant gene from the wild species into eggplants, asymmetric fusions were done between Solanum integrifolium and S. melongena. Protoplasts of S. melongena were isolated from hypocotyles, and protoplasts of S. integrifolium were isolated from young leaves. Protoplasts of S. integrifolium were irradiated by soft x-rays (40-60kR), and fused with protoplasts of S. melongena by electric pulses. Fused protoplasts were cultured using TM-2 basal medium supplemented with 2,4-D (0.5 mg/l), NAA (0.35mg/l), and BA (2mg/l). After 30 days, calli of 1-2 mm in diameter were subcultured on agar medium supplemented with IAA (0.2mg/l) and Zeatin (4mg/l). After 15-30 days, shoots were regenerated from green calli. Regenerated plants were transplanted to the greenhouse and 382 plants were inoculated with Fusarium oxysporum. Thirty-two plants were resistant or tolerant, their chromosome numbers varied in the range of 35-42 (S. integrifolium, S. melongena 2n=2x=24).

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Advances in breeding of okra [Abelmoschus esculentus (L.) Moench.] in India

Okra, an important vegetable of the tropics and sub-tropics is very popular in India. Its production is limited by "yellow vein mosaic virus". Advances in breeding for resistance to this virus have been made through inter-specific hybridisation as well as mutagenesis.