

Brassica and *Moricandia* Hybridized

Wild relatives of *Brassica* are a source of many useful genes. One such relative, *Moricandia arvensis*, was reported to have an intermediate photosynthetic system with a carbon dioxide compensation point between C3 and C4 plants. It is also water use efficient and possesses a high degree of resistance to several fungal diseases. P.B. Kirti, S.B. Narasimhulu, Shyam Prakash, and V.L. Chopra (71), at the Indian Agricultural Research Institute, New Delhi, India, have produced an intergeneric somatic hybrid between *M. arvensis* and *B. juncea* so as to combine the cytoplasm of the two species to increase the cytoplasmic variability and introgress desirable nuclear genes conferring agronomic advantages to *B. juncea*.

Comments of P.B. Kirti: Our laboratory had earlier developed a simple protocol for efficient regeneration from hypocotyl derived protocols of *B. juncea*, the Indian mustard. With this protocol, the mesophyll derived protoplasts of the wild species do not regenerate. When hypocotyl protoplasts of *B. juncea* and mesophyll protoplasts of the wild species were fused, only hypocotyl derived *B. juncea* protoplasts and fusion products survived and divided further.

Among the regenerated plants, distinction between *B. juncea* and the somatic hybrids was easy. Using this approach many somatic hybrids have been produced. This method of fusion-regeneration seems suitable for producing somatic hybrids between *B. juncea* and wild species for introgressing desirable genes (resistance to the diseases alternaria blight and white rust) into cultivated forms and transferring the alien cytoplasm across species. All hybrid combinations produced have been taken to the field and are being utilized in mustard breeding programmes.



Martin Fellner

Isolation of Pollen Protoplasts

Studies on protoplast isolation were carried out by Martin Fellner and Pavel Havranek (72), at the Institute of Experimental Botany and the Research Institute of Vegetable Growing and Breeding, Czechoslovakia, with mature pollen grains of 29 samples from various *Allium* spp.

Comments of Martin Fellner: As to my work on *Allium* protoplasts. I started my experiments in 1988 in Dr. Pavel Havranek's laboratory in Olomouc. Dr. Pavel Havranek is an expert in *Allium* plants, firstly as to virology, and he also works on a breeding program aiming at the restoration of garlic pollen fertility. He owns an ample germplasm collection of *Allium* species.

Our experiments aimed to build a procedure for obtainment of protoplasts from mature pollen grains or younger microspores, such a procedure could be used for future experiments with somatic and gameto-somatic hybridization or for direct transformation to overcome the problems involved in sexual reproduction of *Allium* plants.

In agricultural research, firstly in breeding, the partial or total renewal of garlic fertility would revolutionize the production of this plant by enabling F1 hybrid production. Finally, our experiments wanted also to contribute to an investigation of the behavior of pol-

len grains or pollen protoplasts in *in vitro* conditions. At the same time I worked on the culture of *Allium* protoplasts prepared from somatic cells, firstly leaf and callus protoplasts of garlic *A. sativum* and *A. longicuspis*. This research aimed to the achievement of plant regenerants through culture of protoplasts because any efficient regeneration procedure is a necessary condition and key step for experiments with hybridization of protoplasts.

I continue with these studies in the Institute of Experimental Botany of Czechoslovak Academy of Sciences in Olomouc where I started to work in February 1991 (I worked there five years ago, from 1986 after termination of University studies, through 1988). I collaborate with Dr. Pavel Havranek henceforth, because the investigations on *Allium* plants are not interesting for a majority of the people in Czechoslovakia, and he is a person who is indeed interested in *Allium* plant research. As soon as possible I would like to publish our new article concerning the culture of *Allium* somatic protoplasts.

As to my future career. I would like firstly to find some persons or research groups who would be willing to help in the identification of contaminating microorganisms in garlic plants and garlic tissue cultures, as well as *Allium* protoplast research directly.

Electro-Fusion and -Poration of Plants

Electrofusion and electroporation both induce transient, unstable regions in membranes using short, high-voltage electrical fields. Sally L. Van Wert and James A. Saunders (73), at SARC USDA-ARS, Beltsville, MD, have reviewed the development of these two techniques as they apply to plants and highlight mechanisms for cell fusion, molecular exchange, and parameters that affect the efficiency of fusion and electroporation. (Continued)