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Development of transgenic resistant pepper plant to multivirus infection with virus and host-derived genetic resources

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Virus diseases annually reduce yield and quality of all pepper types including bell and hot peppers varieties. *Cucumber mosaic virus* (CMV) is one of the most important virus diseases of pepper in Korea as well as worldwide. The virus exists as a number of strains, but all are apparently capable of infecting pepper and differ only in symptom expression. *Pepper mottle virus* (PepMoV) is emerging pathogenic potyvirus diseases of pepper in Korea. Objective of our project is the development of transgenic resistant pepper plant to multivirus infection, mainly to CMV and PepMoV, with virus and host-derived genetic resources. We have characterized symptomatology of main pepper-infecting viruses, and symptoms caused were a mosaic and veinal chlorosis (CMV), a mild mosaic (*Pepper mild mottle virus*, PMMoV) and a mottle (PepMoV) in pepper crops. There are many kinds of CMV strain that could infect pepper plants. Although CMV strains differ in host range and pathogenicity, the CMV-FNY strain (CMVP0 pathotype) had been dominated in pepper cultivars in Korea causing a severe yield loss once infected. Thanks to brilliant breeding skills, pepper breeders was able to develop CMV resistant peppers against CMVP0 pathotype and consequently produced many pepper varieties. Those varieties have been commercially available for last several years in Korea and now most of the pepper varieties contain the resistant gene. Using Callus-Induced-Transformation method for pepper transformation, we have obtained 10 different T₀ plants transformed by a *CMVP0-CP* gene. Around 600 T₁ peppers were challenged to CMVP1 pathogen and the resistant transgenic peppers were selected. A total of 19 peppers were selected as resistant to CMVP1 infection, and the 3rd resistance experiment has now been investigated.

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