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Comparison of Virus Elimination Methods for Disease-free Seedlings of the Apple Dwarfing Rootstock

Young Hee Kwon1*, Joung Kwan Lee1, Hee Kyu Kim1, Kyung Ok Kim1, Jae Seong Park1, Yoon Sun Huh2, Yeo Joong Yoon3

1Horticultural Research Division, Chungcheongbuk-do Agricultural Research and Extension Services,
2Crops Research Division, Chungcheongbuk-do Agricultural Research and Extension Services
3Uniplantech, 498, Samyang-ro, Daeso-myeon, Eumseong-gun, Chungcheongbuk-do, 27659, Republic of Korea

사과 왜성대목 무독묘 생산을 위한 바이러스 제거 방법 비교

권영희1*, 이정관1, 김희규1, 김경옥1, 박재성1, 허윤선2, 윤여중3
1충청북도농업기술원 원예연구과, 2충청북도농업기술원 작물연구과, 3(주)유니플랜텍

Apple (Malus domestica) is one of the most economically important fruits in Korea. But virus infection has decreased sustainable production of apple and caused the serious problems such as yield loss and poor fruit quality. Virus or viroid infection including Apple chlorotic leaf spot virus (ACLSV), Apple stem pitting virus (ASPV), Apple stem grooving virus (ASGV), Apple mosaic virus (ApMV) and Apple scar skin viroid (ASSVd) has been also reported in Korea. In many cases, apple is infected with virus and viroid with no specific symptoms, the damage caused by the virus are unaware significantly. In our research, we tried to eliminate viruses in the rootstock for the disease-free seedlings of the apple dwarfing rootstock M.9 and M.26. The method of virus elimination was meristem culture, heat(37℃, 6weeks) treatment and chemistry(Ribavirin©) treatment. The analytical methods commonly used for the detection of virus is Enzyme-linked Immuno-Sorbent Assay(ELISA) and Reverse Transcription-polymerase Chain Reaction(RT-PCR). RT- PCR method was more 30% sensitive than ELISA method. Efficiency of method eliminate virus appeared meristem method〉 heat treatment〉 chemistry treatment. The higher acquisition rate of disease-free seedlings is 30~40% on meristem treatment. In meristem treatment, the apple dwarfing rootstock M.9 gained infection ratio of ACLSV, ASPV and ASGV were 45%, 60% and 50% respectively. In the apple dwarfing rootstock M.26, infection ratio of ACLSV, ASPV and ASGV were 40%, 55%, 55%, respectively. Based on our results, it was found that most effective method of disease-free seedlings apple dwarfing rootstocks was by meristem treatment than heat method and chemistry treatment.

Key Words : Apple, disease-free seedlings, ELISA, RT-PCR

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T. 043-220-5652, F. 043-220-5629, tomato94@korea.kr