

**Title** 1-MCP can prevent ethylene-induced damage to fruit trees during cold storage  
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### Abstract

At present, about 50% of the young fruit trees is stored for more than one month in cold rooms between lifting in the nursery and planting in spring in the orchard with a maximum storage duration of 5-6 months. Storage of fruit trees requires the absence of ethylene in the storage room, as this gaseous plant growth regulator may induce damage to the trees during storage, which eventually may lead to the death of branches or the whole trees after planting the tree in the orchard. In 2007 a series of experiments was carried out to find out the sensitivity of 'Conference' pear trees to ethylene. In addition, the possible use of 1-MCP treatment before storage of the pear trees was examined as a means to prevent ethylene-induced damage. Tree damage was monitored during and directly after storage as well as after planting the trees in the orchard in spring following the storage period in winter. Ethylene-induced symptoms are the discoloration and death of local areas of bark tissue, death of buds and the occurrence of local cracks in the bark followed by the growth of callus tissue. Ethylene-induced damage was observed only when trees were exposed to 5 mg/L ethylene for 1 month at a temperature of 4°C. No damage occurred in case trees were only exposed to this concentration for 1 week at 4°C or for up to 1 month when stored at a temperature of 0°C. Trees treated with 1-MCP before storage did not develop any damage when exposed to 5 mg/L ethylene for 1 month at 4°C, demonstrating that 1-MCP is also taken up by trees harvested after leaf drop. Sensitivity towards ethylene seemed to be dependent on the time of lifting of the trees in the nursery. A trend was observed that trees grubbed in January developed less symptoms after a month exposure to 5 mg/L ethylene at 4°C than trees given the same treatment but lifted in November or March. This suggests that fully dormant trees are less sensitive to ethylene than trees lifted in autumn or spring. Amelioration of the damage after planting the trees in the field was strongly dependent on the amount of damage occurred during storage. Trees with only a little damage recovered quite well, but those with more severe damage often did not recover. Branches or even the whole tree died as result of the damage symptoms developed during storage. Trees treated with 1-MCP before storage showed a normal development after planting in the orchard and were indistinguishable from the untreated control trees. Further research is needed to more accurately determine the concentration, duration and temperature

during exposure at which ethylene becomes harmful to pear trees in storage in order to prevent damage and optimise the use of 1-MCP.