The Role of Calcium and Zinc on Increasing the Yield and Quality of Apple : Calcium and zinc the forgotten nutrients for orchards1

M.J.Malakouti

professor,Tarbiat Modarres University & Director General, Soil and Water Reserch Institute For the Second Congress of Hortinultural Science, Karaj,Iran,Sept.2000

Calcium (Ca) is one of the vital elements in the nutrition of fruit trees and participation in the cellular functions as well as increasing the resistance of the cell member to the external factors such as cold,diseases,etc.Despite the calcareeous nature of soils, in fruit orchards, calcium deficiency symptoms are noticeable among these trees because of the slow translocation of this element in the xylems, and because of the greaterrate of transpiration in leaves compared with fruits. Various investingations in the past 3- years on the role and time of foliar application of calcium chloride on apple showed that the fruit texture had improved. The greatst result came from 1% solution of CaC12(corrected PH) which have been applied six times. this treatment resulted in 11.5% mprovment which lasted 130 days in storage; however, there was no significant difference among the fimness of apples after 160 days of storage. Increasing the storage period with more firmness of apple should be studied later. In conclusion red apple varieties need more frequent foliar spray then yellow apple varieties. Dipping apple in calcium chloride solution will only stabilize the outer coatings of apple but will not improve its internal firmness.

Applying zinc sulphate at the rate of maximum one Kg/tree, placed in deep holes, will cause lowering of plant cell PH in trees irrigated with bicarbonated waters, and eventually will correct the pale color of the fruit trees. Neither soil tests, nor leaf analysis will provide the answer for fruit trees nutritional

transmembrane protein in this virus is located in a different places in the genome. Also contrary to other members of Closteroviridae, RdPd does not seem to be expressed by ribosomal frame shifting. Results obtained from this study suggest that LCV of British Colombia is completely different from the LCV reported from Germany and should be considered as a new genus within Closteroviridae. We suggest the name Aviumovirus for this new genus as it *infects cherry trees (Prunus avium)*. The three coat protein genes of LCV were cloned and transferred to E.coli. and expressed in vitro. Proteins were purified and injected to rabbits to develop polyclonal antibodies. These antibodies specifically detected the purified coat proteins as well as the virus particles detected in low concentrations using ELISA and Western blot. Field trials of these antibodies are now being conducted.