Title Induction of pear ripening capacity as influenced by harvest maturity, conditioning temperature, and ethylene treatment

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Abstract

Most pear (*Pyrus communis*) cultivars require postharvest conditioning in order to develop ripening capacity. In this study, the influence of fruit maturity at harvest, conditioning temperature and exposure to exogenous ethylene on the time required for fruit to develop ripening capacity was evaluated. 'Bosc' pears harvested at first maturity (<71 N fruit firmness) needed 15 d to develop ripening capacity at -0.5°C, ~10 d at 5°C, and <5 d at 10°C. Conditioning time at -0.5°C to develop ripening capacity decreased linearly with later harvest to zero when fruit were harvested 28 d after first maturity. After 24 h in 100 µl L^{-1} ethylene at 20°C, 'Bosc' pears were capable of ripening to a buttery-juicy texture without further temperature conditioning. 'Comice' pears harvested at first maturity (<58 N) developed ripening capacity in 30 d at -0.5°C, ~18 d at 5°C, and ~12 d at 10°C. Conditioning time at -0.5°C decreased linearly with later harvest to ~15 d when fruit were harvested 28 d after first maturity. After 24 or 48 h of ethylene conditioning, subsequent temperature conditioning progressed more rapidly with increasing conditioning temperature up to 10°C. After 72 h in 100 µl L^{-1} ethylene at 20°C, 'Comice' pears were capable of ripening without further temperature conditioning. 'd'Anjou' pears harvested at first maturity (<67 N) developed ripening capacity in 60 d at -0.5°C, ~30 d at 5°C, and ~18 d at 10°C. Conditioning time at -0.5°C needed to develop ripening capacity decreased linearly with later harvest to ~22 d when fruit were harvested 28 days after first maturity. 'd'Anjou' pears harvested at 67 N treated with 100 µl L^{-1} ethylene at 20°C for 24 h required additional conditioning for 30 d at -0.5°C, 20 d at 5°C, or 7 d at 10°C to develop ripening capacity. After 48 h in ethylene an additional 20 d at -0.5°C, 8 d at 5°C, or 4 d at 10°C were required. After 72 h in ethylene 'd'Anjou' pears required no further conditioning. Using conditioning temperatures of -0.5, 5, 8, 10, 12, 14, 16, or 18°C, peak efficiency for induction of ripening capacity in 'Comice' and 'd'Anjou' pear fruit was observed at 10°C.