Abstract

The objective of this research was to develop a model to predict, at-harvest, the risk of grey mould in pear fruit (*Pyrus communis*) in long-term cold storage based on multiple variables including: i) density of *Botrytis cinerea* DNA on fruit surfaces at harvest; ii) fungicide application within 4 weeks before harvest; iii) rainfall within 2 weeks before harvest; and iv) a relative orchard tree-growth and management rating. The model classified grey mould risk as low, moderate, high, or extreme. Data were collected for 2 years in six pear orchards in New Zealand and for 3 years in eight pear orchards in the Mid-Columbia district of Oregon and Washington, USA. Risk predictions varied from low to extreme, and the corresponding grey mould incidence varied from 0.1 to 14.0%. The multiple R-square was 0.973 when all predictors were included. The Spearman rank correlation coefficient (r_s) relating the predicted grey mould risk level to the actual incidence of grey mould in pear fruit was 0.882 ($P = 0.000$). The decay risk prediction model presented herein appears robust and gave reliable predictions of grey mould risk in d'Anjou and Bosc pear fruit from Oregon–Washington and New Zealand in all three years.