

**Title** How to choose criteria to harvest apples? The dynamics of maturity  
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### **Abstract**

The storage behaviour of apples is simulated with a model based on the changes in green ground colour of three apple cultivars ('Elstar', 'Topaz' and 'Pinova') during ripening on the tree in the same orchard in three consecutive seasons, and also the effects of at-harvest maturity criteria. Taking the variation over the seasons into account (mainly found in the potential greenness), using a fixed fraction of ground colour at the moment of harvest as a harvest criterion was found to exhibit a better performance than using a harvest criterion of a fixed colour. The second part of the paper deals with theoretical relations between the product properties at the moment of harvest. These relations constitute the calibration curve per season for harvest indices like the Streif index. Variations in properties due to different seasonal conditions can affect the range of colour, as indicated in previous examples, and the synchronisation in the biological shift factor for different properties (here colour and firmness). The first effect (colour range) generates a change in slope between the two variables (colour and firmness), the second one a parallel shift. These findings can be used to improve the general performance of harvest indices over the seasons and orchards.