Title A weight coefficient of variation based mathematical model to support the production of 'packages labelled by count' in agriculture

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Abstract

Accurate weight-based packing of 'packages labelled by count' necessitates very low 'coefficients of variation (CVs) of unit weight. For agricultural products, with relatively high CVs, the usual weighing methods are therefore not suitable. An innovative weighing methodology was developed to produce 'packages labelled by count' utilising a weighing procedure. It was shown that each product is uniquely characterised by its CV, and a mathematical weight-CV-based model was developed for cuttings 'packages labelled by count'. It determines the critical package weight most compatible with the package specifications, according to the particular product CV. Five packaging characteristics were defined, and were examined for packaging various numbers of cuttings of several ornamental plant varieties. It was found that the coefficients of the 'strategy regression equation' (BV coefficients) are invariant constants, independent of the nature of the product or its CV and they can be utilised to generate a unique equation which determines the dependency of the critical package weight on the CV. This methodology can be applied when the CV is high and the counting procedure is inaccurate and expensive.