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TECHNICAL WORKING PARTY FOR FRUIT CROPS

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METHOD OF OBSERVATION FOR DERIVED CHARACTERISTICS

Document prepared by New Zealand

BACKGROUND

1. The Technical Working Party for Fruit crops (TWF), at its forty-sixth session in 2015, held in Mpumalanga, South Africa, from August 24 to 28, 2015, agreed to discuss the item "method of observation for derived characteristics" at its next session (see document TWF/46/29 Rev. "Revised Report", paragraph 139).
2. The TWF at its forty-sixth session, requested the expert from New Zealand to draft a proposal.

INTRODUCTION

Method of observation for characteristics involving ratios

3. Characteristics involving ratios have proven to be useful for the description of a variety and for the determination of distinctness. It is important to recognize that the ratio characteristic is a derived characteristic and cannot be effectively determined without the evaluation of the two component characteristics. In some cases a ratio characteristic can be more reliable and consistent than the individual components.

Examples of ratio characteristics:

Leaf blade: length/width	derived from Leaf blade: length and Leaf blade: width
Leaf: length of petiole relative to blade	derived from Petiole: length and Leaf blade: length
Fruit height/diameter	derived from Fruit: height and Fruit: diameter
Fruit: width of core relative to fruit	derived from Fruit: width of core and Fruit: width
Ripe fruit: ratio fruit length/seed length	derived from Ripe fruit: length and Seed: length
Fruit: diameter of calyx in relation to fruit	derived from Fruit: diameter of calyx and Fruit: width

EXPLANATION ON CURRENT PRACTICES IN NEW ZEALAND

Derived characteristics such as ratios can be determined using several methods of observation.

4. A ratio characteristic may be assessed visually by assessing the individual component characteristics or by observing the characteristic as a whole. For visual assessment to be reliable a set of example varieties would be advantageous.

5. The components of a ratio characteristic are often measurable and can be combined to calculate the ratio values. The calculation of the ratio values can be determined by a plot or group approach following the principle of MG or values determined per plant or per organ following an MS approach.
6. The collected data can be evaluated in three different ways.
- A value per plant, where several organs are measured and combined to determine the value per plant and then those are combined to determine the value for the characteristic MS
 - A value per sample, where individual organs are measured to determine a value per organ and those values are combined to determine the value for the characteristic MS
 - A value per plot, where one or more organ measurements are combined to determine the value for the characteristic MG

Example

Apple variety 'Delblush'

Fruit: height

Fruit: width

Fruit: height/width ratio

Tree	One			Two			Three			Four			Five		
Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fruit height mm	71	81	65	74	76	73	72	76	75	75	74	81	72	75	73
Tree mean	72			74			74			77			73		
Fruit width mm	75	72	68	74	73	72	68	70	76	72	76	78	73	74	73
Tree mean	71			73			71			75			73		
Fruit Ratio per sample	0.95	1.13	0.96	1.00	1.04	1.01	1.06	1.09	0.99	1.04	0.97	1.04	.99	1.01	1.00
Fruit ratio per tree	1.01			1.01			1.04			1.03			1.00		

MS approach

- The mean ratio value per tree falls in a range of 1.00 to 1.04
- The ratio value per fruit sample falls in a range of 0.95 to 1.09

MG approach

The ratio derived from the mean of all fruit height samples and the mean of all fruit width samples = 1.02

The above values can then be translated into a state of expression using the authority's calibration scale established for the characteristic.

CONCLUSION

7. Based on the above example the ratio values are very similar irrespective of the approach taken and the decision on how to observe the ratio characteristic using MG or MS should be primarily influenced by the authority's testing practice. The above example provides no evidence to suggest that the method of observation influences or alters the state of expression.

8. The method of observation for derived characteristics, such as ratios, should be decided independently of the method used to observe the component characteristics. There may be a connection with respect to the data collection process but there should not be the assumption that the derived characteristic will be the same as the component characteristics.

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