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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL WORKING PARTY FOR VEGETABLES

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METHOD OF CALCULATION OF COYU

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1. At its twenty-sixth session held in Jeju, Republic of Korea, from September 2 to 5, 2008, the Technical Working Party on Automation and Computer Programs (TWC) considered document TWC/26/17 "Some consequences of reducing the number of plants observed in the assessment of quantitative characteristics of reference varieties[1]" and a presentation by Mr. Kristian Kristensen (Denmark), a copy of which is reproduced as document TWC/26/17 Add.

2. Document TWC/26/17 states the following with regard to the current method of calculation of the Combined-Over-Years Uniformity Criterion (COYU):

> "Conclusions
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> "18. From the above it can be concluded that the variances calculated in the present system do not reflect the expected value of the true variance as they are too small, partly because the expected value of RMS [residual mean square] from the ANOVA is less than the expected value of $Var(Y_v)$ and partly because only the number of varieties used in the local adjustment influence[s] this variance (and not the total number of reference varieties). However, the present method probably adjusts for this bias by using a large t-value (by using a small α-value). Also it can be concluded that the residual mean square (RMS) may depend significantly on the number of observations recorded as the

[1] The term "reference varieties" here refers to established varieties which have been included in the growing trial and which have comparable expression of the characteristics under investigation.

component of RMS that depends on the number of observations (degrees of freedom) was not a negligible part."

3. The TWC noted the following possible actions to address the bias in the present method of calculation of COYU, as identified and commented on by Mr. Kristensen:

(i) Ignore the biases
(comment: the test will most probably be too liberal);
(ii) Correct only for the bias introduced by the smaller sample sizes
(comment: the test will be too liberal, but will be comparable to those in the past);
(iii) Correct only for the present bias
(comment: the test will be conservative, but not comparable to the past);
(iv) Correct for all biases
(comment: there will be no biases, but the tests will not be comparable to the past)

4. The expert from the Netherlands speculated that the smoothing spline could be a valid alternative to the moving average proposed in COYU. The expert from Poland wondered whether the possible correlation on the trend values would influence the results. The expert from Denmark explained that the value of the expected residual mean square depended only on the variances and thus was independent of the correlation between the trends. An expert from France considered that the conclusions on the influence of the reduction in the number of plants in COYU presented in the document were very relevant, given that the reduction in the number of plants was under consideration by many UPOV members in order to reduce costs in DUS examination. He wondered whether some adaptation in the program should be made. An expert from the United Kingdom considered that it would be useful to perform some simulations to see the effect of the reduction in the number of plants as well as to explore possible routines to be incorporated into COYU, such as the one proposed by the expert from the Netherlands. He offered to cooperate in that task. The expert from Denmark explained that he had made a simulation which had confirmed the bias of the present method of calculation of COYU. He added that it would be possible to incorporate another trend correction method in the simulation program, but he did not have experience in the use of the smoothing spline method.

5. The TWC agreed that Denmark and the United Kingdom should prepare a new document, including a simulation using the smoothing spline method. It was noted that that would also allow experts further time to reflect on the situation and possible ways forward.

6. The Technical Committee, at its forty-fifth session, held in Geneva from March 30 to April 1, 2009, noted the discussions concerning the current method of calculation of COYU, as set out above, and agreed that the Technical Working Parties (TWPs) should be informed about those discussions at their sessions in 2009. The TC requested the TWC to make its recommendations to the TC concerning the proposals set out in paragraph 3 of this document.

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