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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**TECHNICAL WORKING PARTY ON AUTOMATION AND  
COMPUTER PROGRAMS**

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QUANTITY OF PLANT MATERIAL REQUIRED

*Document prepared by an expert from the Netherlands*

INTRODUCTION

1. At its thirty-fourth session, held in Angers, France, from September 11 to 15, 2000, the Technical Working Party for Vegetables (TWV) considered document TWV/34/11 "Survey on required amount of plant material to be submitted, plant number in the field and sample size in the existing UPOV Test Guidelines", which proposed a systematic approach for determining the required amount of plant material on the basis of a formula to produce the required number of plants in the field.

2. The report of the thirty-fourth session of the TWV (document TWV/34/15) stated as follows:

"21. An expert from the Netherlands explained document TWV/34/11, which proposed a systematic approach for determining the required amount of plant material on the basis of a formula to produce the required number of plants in the field.

"22. Several experts referred to the need to take into account additional amounts required for reference collection and post-control tests. However, the Chairman noted that the average life span for vegetable seed in storage was not very long and that the renewal of seeds was usually essential. The Working Party confirmed that the proposal and UPOV Test Guidelines were just recommendations for the required amounts at a

national level. However, the systematic framework presented in the proposal could be the basis for each country to determine the required numbers in accordance with additional needs prevailing for their circumstances.

“23. In general, the Working Party found the proposal very reasonable and useful. The proposal would restrict the amount of plant material to that really needed and, in addition, address the question frequently received from applicants as to why so much plant material should be submitted. The Working Party decided to follow the proposal in principle for preparation of UPOV Test Guidelines and to send the document to other Technical Working Parties for their reference.

“24. The Working Party decided to specify the required seed number rather than, or in addition to the required seed weight in vegetable Test Guidelines where this was more appropriate.”

3. In the TWV sessions, the quantity of plant material (number or amount in grams of seed, number of plants), the number of plants in the test and the number of plants or parts of plants to be examined continues to be a subject for discussion in the drafting or revision of Test Guidelines. The number of plants to be included seems more dependent on the usual crop management than on comparable statistical approaches. In some cases, with extra tests such as resistance tests, the number of plants required seems to have no relation to the number of plants in the test or the number of plants to be measured.

#### CURRENT GUIDANCE

4. Guidance on the quantity of plant material required and the test design is provided by document TGP/7.

#### *Quantity of plant material required*

5. Document TGP/7/2 Draft 5, Annex 3: Guidance Notes (GN) for the TG Template, states as follows:

“GN 7 (TG Template: Chapter 2.3) –Quantity of plant material required

“The drafter of the Test Guidelines should consider the following factors when determining the quantity of material required:

- “(a) Anticipated level of plant establishment, from submitted plant material, for field trials or other growing tests;
- “(b) Quantity of submitted plant material to be used for non-growing tests (e.g. erucic acid test for Rape seed);
- “(c) Quantity of submitted plant material to be used for quality checks on the submitted plant material (e.g. germination tests for seed);
- “(d) Quantity of submitted plant material to be used for reference samples;
- “(e) Rate of deterioration during storage.

“In general, in the case of *plants* required only for a single growing trial (e.g. no plants required for special tests or variety collections), the number of plants requested in Chapter 2.3 should often corresponds to the number of plants specified in Chapters 3.4 [cross ref.] “Test Design” and 4.2 “Uniformity”. In that respect, it is recalled the quantity of plant material specified in Chapter 2.3 [cross ref.] of the Test Guidelines is the minimum quantity that an authority might request of the applicant. Therefore, each authority may decide to request a larger quantity of plant material, for example to allow for potential losses during establishment (see Section 1.1.2 (a) [cross ref.]). In relation to the number of plants specified in Chapter 2.3, the number of plants/parts of plant to be examined (Chapter 4.1.4), should at least allow for the possibility of off-type plants within the tolerated number to be excluded from observations.”

### *Test design*

6. Document TGP/7/2 Draft 5, Annex 3: Guidance Notes (GN) for the TG Template, states as follows:

“GN 10 (TG Template: Chapter 3.4) – Test design

“Document TGP/8, Use of Statistical Procedures in DUS Testing contains guidance on experimental design.”

7. Document TGP/8/1 Draft 15, Part I: 1. DUS Trial Design, states as follows:

“1.5.2 Number of Plants in the trial

“1.5.2.1 The number of plants/parts of plants to be examined in the trial is influenced by several factors such as genetic structure of the variety, way of reproduction of the species, the agronomic features and the “feasibility” of the trial. The most significant criteria to determine the number of plants are, and, in particular, the variability within and between varieties, and the method of assessment of distinctness and uniformity.

“1.5.2.2 Where there is, in general, low variability within varieties and large variability between varieties (e.g. for many vegetatively propagated varieties of fruit and ornamental crops), characteristics can be visually observed, and it is not necessary to examine a large number of plants/parts of plants to examine DUS. For these crops, distinctness can be assessed by side by side visual comparison. Uniformity is assessed by off types, on the basis of all plants in the plot.

“1.5.2.3 Where there is, in general, low variability within varieties and also low variability between varieties, and a large number of varieties, more precision is required. In this situation, such as in some self-pollinated varieties, the number of plants to be examined is, in general, larger than for vegetatively propagated varieties.

“1.5.2.4 Where statistical analysis of individual plant data is used for the assessment of distinctness and uniformity, such as for cross-pollinated varieties, the number of plants to be examined will depend on the number of records necessary for the appropriate statistical analysis. See section 1.5.3.1.3”

*Number of Plants / Parts of Plants to be Examined*

8. Document TGP/7/2 Draft 5, Annex 1: TG Template, Chapter 4.1.4, states as follows:

“4.1.4 Number of Plants / Parts of Plants to be Examined

“Unless otherwise indicated, all observations for the purposes of distinctness should be made on { x } plants or parts taken from each of { x } plants, disregarding any off-type plants.

“{ ASW 7(b) (Chapter 4.1.4) – Number of Plants / Parts of Plants to be Examined }”

9. Document TGP/7/2 Draft 5, Annex 2: Additional Standard Wording (ASW) for the TG Template, ASW 7(b), states as follows:

“ASW 7(b) (Chapter 3.5 4.1.4) – Number of plants / parts of plants to be examined

“(a) Test Guidelines where all plants in the test are observed for all characteristics  
The following sentence may be added where appropriate:

“In the case of observations of parts of plants, the number of parts to be taken from each of the plants should be { y }.”

“(b) Test Guidelines where the observation of certain characteristics is made on a sample of plants in the test

Alternative 1: “Unless otherwise indicated, all observations on single plants should be made on { x } plants or parts taken from each of { x } plants and any other observations made on all plants in the test.”

“Alternative 2: “Unless otherwise indicated, all observations on single plants should be made on { x } plants or parts taken from each of { x } plants and any other observations made on all plants in the test. In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be { y }.””

## CONCLUSION

10. The guidance in TGP documents for determining the quantity of plant material, the number of plants in the test (including resistance tests) and the number of plants to be examined is not comprehensive and the relation between those numbers of plants is not clearly defined.

## PROPOSAL

11. It is proposed to include guidance in document TGP/7 for determining the quantity of plant material, the number of plants in the test (including resistance tests) and the number of plants to be examined. To determine those quantities and numbers, the guidance should contain the following elements, which should be related:

- (a) Quantity of plant material required:
- (i) Number of plants/ parts of plants to be examined
  - (ii) Number of growing cycles
  - (iii) Variability within the crop
  - (iv) Additional tests (e.g. resistance tests, bolting trials)
  - (v) Features of propagation (e.g. cross pollination, self pollination, vegetative propagation)
  - (vi) Crop type (e.g. root crop, leaf crop, fruit crop, cut flower, cereal, etc.)
  - (vii) Storage in variety collection
  - (vii) Exchange between testing authorities
  - (viii) Seed quality (germination) requirements
  - (ix) Cultivation system (outdoor/glasshouse)
  - (x) Sowing system
  - (xi) Predominant method of observation (e.g. MS, VG)
- (b) Number of plants in the test (including resistance tests?):
- (i) Number of plants/ parts of plants to be examined
  - (ii) Variability within the crop
  - (iii) Type of observations
  - (iv) Features of propagation (e.g. cross pollination, self pollination, vegetative propagation)
  - (v) Crop type (e.g. root crop, leaf crop, fruit crop, cut flower, cereal, etc.)
  - (vi) Median number from the tables of uniformity levels
- (c) Number of plants/parts of plants to be examined:
- (i) Variability within the crop
  - (ii) Type of observations
  - (iii) Features of propagation (e.g. cross pollination, self pollination, vegetative propagation)

#### COMMENTS OF THE TECHNICAL WORKING PARTIES AT THEIR SESSIONS IN 2010

12. At its thirty-ninth session, held in Osijek, Croatia, from May 24 to 28, 2010, the Technical Working Party for Agricultural Crops (TWA) considered document TWA/39/12 (see document TWA/39/27 “Report”, paragraphs 40 to 42).

13. The TWA observed that document TGP/7 already provided guidance with respect to the quantity of plant material required in Guidance Note GN 7 and recalled that attempts in the past to develop a formula to determine the quantity of plant material had not been successful. With regard to the development of any further guidance, the TWA agreed that such guidance should be confined to “Quantity of plant material required”, as considered in paragraph 11 of document TWA/39/12 (paragraph 11 of this document), and should not extend to the matters covered in paragraph 11 (b) and (c). It also agreed that the guidance should seek to supplement the guidance already contained in GN 7, rather than starting afresh.

14. The TWA agreed that the guidance in GN 7 should be extended to encourage Leading Experts to consider the quantity of plant material required for similar crops in order to seek consistency as far as that was appropriate. It also agreed that guidance should be provided on whether the quantity required related to both growing cycles in the case of Test Guidelines indicating two growing cycles. In that regard, it suggested that previous wording in Test Guidelines, before the adoption of document TGP/7, might provide a useful starting point.

[End of document]