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UPOV

TC/XII/2 005
ORIGINAL: English
DATE: October 2, 1978

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL COMMITTEE

Twelfth Session
Geneva, November 13 to 15, 1978

ASSESSMENT OF HOMOGENEITY OF MEASURED CHARACTERISTICS

Document prepared by the Office of the Union

1. During its eleventh session (November 1977), the Technical Steering Committee discussed the question of the Testing of Homogeneity and Stability. In the course of the discussion, it became evident that the information available on the assessment of certain factors concerning that question was insufficient. The Committee therefore agreed that each delegation should inform the Office of UPOV on the methods applied in its country for the assessment of homogeneity of measured characteristics in order to allow a more detailed discussion on that item during the Committee's coming session (see document ST/XI/6, paragraph 9).

2. The information received so far by the Office of the Union is reproduced in the Annexes to this document (Annex I for France, Annex II for the Federal Republic of Germany, Annex III for South Africa, Annex IV for Sweden, Annex V for Switzerland and Annex VI for the United Kingdom).

[Six Annexes follow]

TC/XII/2

ANNEX I

Information from France

METHODE DE JUGEMENT DE L ' HOMOGENEITE
POUR LES CARACTERES MESURES

a) Espèces autogames

Néant car :

- les caractères quantitatifs ne sont pris en compte à ce niveau que par appréciation visuelle globale

- les mesures effectuées ne sont utilisées que pour la description des variétés.

b) Espèces allogames

Les mesures sont effectuées plante par plante dans un dispositif permettant l'interprétation statistique (généralement bloc de Fisher à 6 répétitions de 10 plantes).

L'homogénéité est appréciée par la variance calculée après élimination de l'effet répétition. Le jugement est ensuite effectué à l'aide du test F calculé par rapport à des variétés de référence figurant dans le même essai ; les variétés dont la variabilité est supérieure à celle des variétés de référence au seuil de p = 0,01 sont considérées comme étant trop hétérogènes.

Fait à La Minière, le 12 Septembre 1978

Y. BOUCHET X. BALLOT

Translation

Method of Assessment of Homogeneity in the Case of Measured Characteristics

(a) Self-Fertilized Species

Nothing to report because:

- quantitative characteristics are determined at this level by overall visual assessment only,

- the measurements taken are used only for the description of the varieties.

(b) Cross-Fertilized Species

Measurements are taken plant by plant according to a method admitting of statistical analysis (generally Fisher's block, with six repetitions of ten plants each).

Homogeneity is assessed according to the variance after elimination of the repetition effect. The judgement is then based on a F-test calculated in relation to reference varieties included in the same trial; varieties the variability of which is greater than p = 0.01 in relation to the reference varieties are considered too heterogeneous.

[Annex II follows]

TC/XII/2

ANNEX II

Information from the Federal Republic of Germany

BUNDESSORTENAMT
Az.: L I 1 - 220

3000 Hannover 72, den 17.8.1978

Homogenitätsbeurteilung bei gemessenen Merkmalen

Bei fremdbefruchtenden und fakultativ fremdbefruchtenden landwirtschaftlichen Pflanzenarten erfolgt eine relative Beurteilung anhand der vergleichbaren Sorten. Als vergleichbare Sorten werden die eingetragenen Sorten desselben Sortentyps herangezogen.

Als Vergleichsmaß wird grundsätzlich die Varianz (s^2) verwendet. Eine Sorte wird in dem betreffenden gemessenen Merkmal als nicht homogen angesehen, wenn - in Anlehnung an den Fischer-Test - ihre Varianz das 1,5-fache der durchschnittlichen Varianz der vergleichbaren Sorten überschreitet.

Bei Gräsern, Futterpflanzen und Ölpflanzen wird als zusätzliche Kontrolle die Zahl der Meßwerte festgestellt, die vom Mittelwert weiter entfernt sind als die doppelte durchschnittliche Standardabweichung (s) der vergleichbaren Sorten. Die Zahl dieser Meßwerte darf nicht deutlich höher sein als beim Durchschnitt der vergleichbaren Sorten.

gez. Fuchs

Translation

Testing of Homogeneity of Measured Characteristics

For cross-fertilized and optionally cross-fertilized agricultural crops a relative judgement is made on the basis of reference varieties. Registered varieties of the same type are used as reference varieties.

In principle a variance of (s^2) is used as the criterion for comparison. A variety is considered to be not homogeneous in the measured characteristic concerned if--with reference to the Fischer text--its variance exceeds 1,5 times the average variance of the reference varieties.

For grasses, fodder crops and oil crops, an additional check is made by determining the number of measured data which deviate from the average by more than twice the average standard deviation(s) of the reference varieties. These data must not be greater in number than the average of the data of the reference varieties.

[Annex III follows]

Information from South Africa

LTD 3002

Telegrafiese Adres:
Telegraphic Address:
"Sativa PRETORIA"
Tel. 27-2141
413111

REPUBLIEK VAN SUID-AFRIKA—REPUBLIC OF SOUTH AFRICA

DEPARTEMENT VAN LANDBOU-TEGNIESE DIENSTE
DEPARTMENT OF AGRICULTURAL TECHNICAL SERVICES

AFDELING PLANT- EN SAADBEHEER
DIVISION OF PLANT AND SEED CONTROL

Verwys asb. in u antwoord na;
In reply please quote;

No. 11/1/13/2/2

LANDBOUGEBOU
HAMILTONSTRAAT
PRIVAATSAK X179
PRETORIA
0001

AGRICULTURE BUILDING
HAMILTON STREET
PRIVATE BAG X179
PRETORIA RSA
0001

1978-08-22

AIR MAIL

Dr. Thiele Mittig
UPOV
32 Chemin des Colombettes
1211 Geneva 20
Switzerland

TECHNICAL COMMITTEE

CONTENTS OF DISTINCTNESS, HOMOGENEITY AND STABILITY

Stability

In the RSA experience has shown that stability is not a major factor when homogeneity is satisfactory. Therefore if the homogeneity and distinguishability is acceptable, the variety is registered. The control measures embodied in the Seeds Act enables the Authority concerned to continue observing stability over years.

Homogeneity

For testing of homogeneity, we are using the method of Analysis of Variance. The experiments are planted mainly in block or lattice designs. Analysis of Variance is carried out in the ordinary way according to the design.

Comparisons between each two cultivar means, is done by using the average Standard Error and application of the t - test or Multiple Range - test by Student-Newman-Keuls-method both at 0,01 level.

Besides, for characteristics where samples have been taken the S.D. among samples was calculated with the object of comparing the S.D. of the candidate cultivars with that of the standard cultivars.

The same methods as described previously, are applied for cross-pollinated crops as well as for selfpollinated crops.

Distinctness

Distinctness of quantitative characteristics, is determined by measuring. In some cases percentage figures are used to indicate the quantitative nature of the characteristic.

For qualitative characteristics the determination is based on observation and experience of the observer.

Where colour is concerned, use is made as far as possible of the R.H.S. colour chart.

Reference Collection

A reference collection is all the varieties known and acceptable to the Authority concerned. This includes seed samples, variety descriptions and a list of names.

Yours faithfully

A.J. [illegible]
for DIRECTOR: DIVISION OF PLANT AND SEED CONTROL

[Annex IV follows]

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TC/XII/2

ANNEX IV

Information from Sweden

At the meeting in Geneva 14-17th November 1977 the member states were asked to deliver a summary of how they determine homogeneity in cross-fertilized plants.

Refering to that we give the following summarized information in a table with explanatory-notes.

Crops	plots	single-plants	visual/measurements		UPOV characters	Standards; example varieties, etc
Rye	+	-[1]	+	+	+[2]	+
Herbage crops	+	++	+	++	+	+
Oil crops	+	-	+	+	+	+
Vegetable crops	-	+	+	+	+	+

\+ = used method
++ = most important method
1) = sown in autumn 1977 according to "German system"
2) = sometimes added with local characters

Results of observations in Rye, oil crops and vegetables are just calculated as averages. Sometimes standard-deviations are calculated.

In Herbage crops the coefficient of variance is used for the characteristics which are measured. The coefficient of variance for new varieties are compared with the mostly grown varieties on the national list. The value of a new variety must not exceed the value of the varieties on the national list.

Sugar Beets are not listed in the table above. In this specie a special investigation is made which we hope will be published within a year.

For further information see ST/XI/2 Annex VI of September 15, 1977.

[Annex V follows]

1978-01-04

Abteilung für Landwirtschaft
Division de l'agriculture
Divisione dell'agricoltura

3003 Bern

☎ 031 61 21 11

TC/XII/2

ANNEX V

Information from Switzerland

Herrn Dr. H. Mast
Vize-Generalsekretär
der UPOV
34, chemin des Colombettes
1211 Genève 20

Ihr Zeichen V. référence V. riferimento	Ihre Nachricht vom V. communication du V. comunicazione del	Unser Zeichen N. référence N. riferimento	Rückfrage Rappel Richiamo	CH-3003 Bern, Mattenhofstrasse 5
U 441-08.4 2046-08.2		WG/je 155		16. August 1978

Sehr geehrter Herr Mast,

beiliegend finden Sie die ausgefüllten Statistikformulare, die Sie uns mit Ihrem Brief vom 12. Juli 1978 zugestellt haben.

Die Fragen, die Sie uns mit Ihren Schreiben vom 31. Juli und 7. August 1978 gestellt haben, die Homogenität und die besondere Stellung der Vermehrungslizenzen betreffend, können wir zurzeit noch nicht beantworten, da wir nicht selber prüfen, und Lizenzen in der Schweiz noch nicht unter dem Regime des schweizerischen Sortenschutzgesetzes erteilt werden.

Mit freundlichen Grüssen

Büro für Sortenschutz

W. Gfeller

Beilagen

4115/112

009

Translation

.....

The questions raised in your letters of July 31 and August 7, 1978, concerning homogeneity and the special status of licenses for propagation cannot yet be answered by us because we do not carry out examination ourselves, and because licenses are not yet granted under the Swiss Law on the Protection of New Plant Varieties.

[Annex VI follows]

Information from the United Kingdom

UPOV TECHNICAL COMMITTEE

Preliminary thoughts on distinctness, uniformity and stability - Note from UK

DISTINCTNESS

In principle, the test authorities should search diligently and make every effort to establish distinctness within the limits of their resources of staff and facilities. The criterion for acceptance of a difference between any two varieties should be the repeatability of the test. Thus any characteristic however small and perhaps needing a hand lens to see, or any disease or chemical test established in a growth chamber or laboratory should be acceptable provided it can be repeated at will. In the case of diseases the specific race must usually be known and be able to be maintained. In the UK we do not accept field observation on reaction to a particular disease which may or may not occur at a particular site or in a particular season as evidence of distinctness.

While there are obvious advantages in using characteristics which can also be used for seed crop certification we should not rule out characteristics which cannot be so used but should require the certification scheme to be so organised as to recognize the situation.

In the UK the breeder of a new variety is asked to name closely similar existing varieties and differences from them. If special tests are required these should only be undertaken when the facilities needed do not involve heavy expenditure and adequate evidence is made available to establish the validity of the test and that it is repeatable. Less sympathy should be extended to a breeder who claims a particular distinctness at the end of the test period when no differences have been found in the normal characteristics and he has made no mention of the difference in his original technical questionnaire.

UNIFORMITY

In the self-pollinating cereals we look for high levels of uniformity in all characteristics used for the determination of distinctness. In grasses and small seeded legumes we compare the standard deviations of important characteristics with those of comparable already accepted varieties while in species where testing techniques are less well developed we make a similar comparison but without statistical analyses (see UK comments on para 9 of ST/XI/6).

An intelligent appreciation of what a breeder can reasonable achieve, bearing in mind the breeding method, is the criterion and it must be neither too strict nor too lenient.

STABILITY

Until recently the UK aimed to test stability during the test period by demanding seed submissions from different generations in the cross-fertilised species. In most self-fertilised species seed is harvested from the plots grown from the first seed submission and this seed is sown for the second year of tests. However, following recent discussions in UPOV - see ST/XI/6 Annex III paras 13 to 19 - consideration is being given to a shift of emphasis on stability from checking prior to acceptance of a variety to checking after acceptance except in cases where the tests show that instability is likely. However, where a lack of homogeneity is evident

the stability of the variety would be regarded as suspect. In grasses, for example, we are now considering a comparison of the two required seed submissions only in row plots whereas previously we have required three seed submissions and these have been compared in spaced plant tests. It is appreciated, however, that row plot comparisons only reveal differences of considerable magnitude.

UPOV TECHNICAL COMMITTEE - TESTING OF HOMOGENEITY - NOTE FROM UK

Para 9 of ST/XI/6 refers.

1. GRASSES AND FORAGE LEGUMES

Homogeneity is assessed in spaced plant tests. The standard deviation from the mean is calculated for each important characteristic measured in the tests. A variety is accepted as homogeneous when the standard deviation is not significantly greater (P=0.01) than that of comparable, already listed, varieties.

2. CEREALS (wheat, barley and oats)

No measurements are made in these species. Homogeneity is assessed mainly in ear-rows but plots are also used. A variety is accepted as sufficiently homogeneous when the number of ear-rows exhibiting one or more characteristics different from that of the variety, ie suffioient to differentiate between two varieties, does not exceed:-

Wheat	6	variant	rows	in	300	(1	year)	or	12	in	600	(2 years)
Barley	3	"	"	"	"	"	"	6	"	"	"	
Oats	6	"	"	"	"	"	"	12	"	"	"	

The plots are judged by similar criteria and a variety is accepted as sufficiently homogeneous when the number of variant plants does not exceed 1-2%.

3. VEGETABLES

Homogeneity is assessed on plots.

Self pollinated species, eg peas

For defined discontinuous characteristics a maximum of 1% plants is permitted while for defined continuous characteristics a maximum of 2% is permitted. Total variation should not exceed 2%. For other characteristics no standard is set but the variety should be comparable in uniformity to already listed varieties. Variants are usually determined visually without reference to any pre-defined standard such as 2 state differences but if necessary a statistical significance may be calculated.

Cross pollinated species, eg broad beans

The uniformity should be comparable to that of already listed varieties of a similar type produced by the same breeding method. Clearly variant plants are determined visually and may, if necessary, be subject to a signficance test. The general uniformity is assessed by comparing coefficients of variation for individual characteristics with those of other accepted varieties.

4. OTHER SPECIES (eg fodder kale)

Homogeneity is assessed on plots. The level of homogeneity must be at least that of other accepted varieties taking into account their method of breeding and maintenance.

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[End of Annex VI and of document]