

**UNITED KINGDOM NATIONAL LIST/ PLANT BREEDERS RIGHTS TECHNICAL
PROTOCOL FOR THE OFFICIAL EXAMINATION OF DISTINCTNESS, UNIFORMITY AND
STABILITY (DUS)**

WHITE CLOVER

(*Trifolium repens* L.)

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SECTION A - GENERAL INFORMATION**1. PURPOSE**

- 1.1 This Protocol sets out the procedures for conducting tests and assessments in relation to official examinations of DUS, maintenance of reference stocks and verification of VCU submissions of varieties of white clover entered for National List (NL) Trials and Plant Breeders' Rights (PBR).

2. SCOPE

- 2.1 These procedures apply to all varieties of white clover. Special procedures and responsibilities for Genetically Modified (GM) varieties are set out in Sections A5 and A6.
- 2.2 Except where specified in this protocol or authorised by APHA Varieties and Seeds, only National List candidates, Plant Breeders' Rights candidates, candidates for Foreign Authorities and the reference varieties may be incorporated in the DUS tests.

3. RESPONSIBILITIES

- 3.1 The growing tests and assessments in this protocol are carried out under the responsibility of the Secretary of State for Environment, Food and Rural Affairs, Scottish Ministers, the Welsh Assembly Government and the Minister for Agriculture and Rural Development in Northern Ireland (the National Authorities).
- 3.2 They are supervised, on behalf of the National Authorities, by officials of the Testing Authorities, which are the The Animal and Plant Health Agency (APHA), the Scottish Government Agriculture and Rural Development Division (SGARD), the Department of Agriculture and Rural Development for Northern Ireland (DARDNI) and the Welsh Government (WG).
- 3.3 This protocol is authorised by the Plant Variety and Seeds Committee (PVSC). It cannot be amended without their approval. Requests and suggestions for amendment of the protocol should be put in writing to APHA Varieties and Seeds, either directly or via the Test Centre.
- 3.4 The procedures are administered by:

Varieties and Seeds
 Animal and Plant Health Agency
 Eastbrook
 Shaftesbury Road
 Cambridge
 CB2 8DR

Tel No 0300 060 0497
 Fax No 0300 060 2115

3.5 Test Centre

The DUS growing tests and assessments in this protocol are co-ordinated and carried out by the:

Herbage DUS Test Centre

Agri-Food and Biosciences Institute (AFBI)

Plant Testing Station

Crossnacreevy

Belfast

BT6 9SH

Tel No 02890 548000

Fax No 02890 548001

3.6 The Test Centre is responsible for providing the appropriate facilities.

4. NON COMPLIANCE WITH THE PROTOCOL

4.1 Where the protocol uses the word “must” for any action then failure to carry out this action will result in non-compliance. Where non-compliance occurs or there are concerns regarding the validity of any data or tests this must be reported to APHA. Where this protocol uses the word “should” for any action this is the method to be followed unless there are clear reasons not to do so which can be justified by the Test Centre as technically sound.

5. RESPONSIBILITY FOR GM RELEASES

5.1 GM Release Consent Holders are responsible for GM releases. All parties involved in DUS work operating under a GM Release Consent must adhere to the instructions of the Release Consent Holder where necessary, to comply with the relevant consent conditions. Where DUS protocol non-compliance occurs, this must be reported to the consent holder and the Test Centre who will notify APHA.

6. PROCEDURES FOR GM VARIETIES

6.1 Applicants intending to enter GM candidates must consult APHA, well in advance of their application, about specific requirements under GM regulations.

6.2 The Test Centre must ensure that no test or trial sites are planted with GM candidates and/or varieties until APHA has given the specific clearances.

7. ASSOCIATED DOCUMENTS

7.1 The following documents are associated with this protocol

Reference	Title
White Clover VCU Protocol	United Kingdom National List Trials: Protocol and Procedures for Examining the Value for Cultivation and Use (VCU) of White Clover
UPOV TG/1/3	General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonised Descriptions of New Varieties of Plants. 19.4.2004
UPOV TGP/8/1	Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability. 21.10.2010
UPOV TGP/9/1	Examining Distinctness. 11.4.2008
UPOV TGP/10/1	Examining Uniformity. 30.10.2008
UPOV TC/33/7	Combined Over-Years Criterion for Distinctness (COYD) and Uniformity (COYU). (Revision of document TC/30/4).
UPOV TG/38/7	Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, White clover. 9.4.2003
Commission Directive	Commission Directive of 2003/90/EC as amended setting out implementing measures for the purposes of Article 7 of Council Directive 2002/53/EC (13 June 2002) as regards the characteristics to be covered as a minimum by the examination and the minimum conditions for examining certain varieties of agricultural plant species.
Council Regulation EC No 2100/94	Council Regulation 2100/94/EC of 27 July 1994 on Community Plant Variety Rights.
Plant Varieties and Seeds (2001) 14 1-14	The potential for management of reference collections in herbage variety registration trials using a cyclic planting system for reference varieties.

SECTION B - APPLICATION REQUIREMENTS**1. PURPOSE**

- 1.1 The purpose of this section is to identify the specific requirements for National List and Plant Breeders' Rights applications.

2. SCOPE

- 2.1 These procedures apply to all applications.

3. RESPONSIBILITIES

- 3.1 The applicants are responsible for ensuring that these procedures are complied with.

4. RECEIPT OF APPLICATIONS

- 4.1 The latest date for receipt of applications for acceptance of a variety onto the National List or for Plant Breeders' Rights, which is set administratively by APHA, is 5 January. Applications received after this date may be considered for inclusion in the current year's tests and trials on a case by case basis.

- 4.2 The procedures for the submission of National List and Plant Breeders' Rights applications, technical questionnaires and for payment of administration fees are set out on the GOV website at <https://www.gov.uk/national-lists-of-agricultural-and-vegetable-crops>.

- 4.3 Applicants should notify APHA of special DUS characteristics which may require additional examinations. These claims should, in addition, be noted in the TQ accompanying the application.

5. RECEIPT OF SEED

- 5.1 The latest date for receipt of seed is 5 February and is set administratively by APHA. Seed submissions received after this date will normally be refused. Instructions for the delivery of seed will be made available to applicants by APHA.

6. SEED QUALITY REQUIREMENTS

- 6.1 The seed must satisfy the quality requirements for Basic Seed as laid down in Schedule 4 Part II of the Fodder Plant Seeds Regulations 2002 as amended.

- 6.2 The seed must not be chemically treated. Seed treatment, where appropriate, will be undertaken by the Test Centre. The chemicals applied and rates of application will be determined by the Test Centre.

7. SEED QUANTITY

- 7.1 Year 1

White clover – tetraploid 1000g*

* Comprises 750g for DUS tests and 250g for VCU trials.

- 7.2 The DUS and VCU seed must be supplied as one lot.
Year 2 and Further Year Submissions

A sample of 5g of seed will be withdrawn from VCU submissions in Year 2 and any further years to authenticate the submission. Applicants should refer to the Trail Procedures for Official Examination of Value for Cultivation and Use (VCU) for White Clover 2007 for year 2 VCU seed requirements.

- 7.3 Shortfall in Seed Quantities

Where sufficient seed is unavailable in the first instance a further stock should be supplied in the following year which will be authenticated against the original submission. An additional charge may be applied.

8. LABELLING REQUIREMENTS, INCLUDING PROVISIONS FOR GM VARIETIES

- 8.1 Applicants **must** clearly label their seed with the following information;-

- Applicant
- Breeder's Reference number or name
- Type of Seed (DUS Only/Combined submission of DUS and VCU for year 1 sowings).
- Quantity of seed

- 8.2 All packages of GM material must be clearly labelled as "GMO" or "Genetically Modified Organism".

SECTION C – GROWING TEST PROCEDURES**1. PURPOSE**

- 1.1 The purpose of this section is to provide details of the procedures used in the growing tests for DUS analysis.

2. SCOPE

- 2.1 These procedures apply to all varieties of White clover.

3. RESPONSIBILITIES

- 3.1 The Test Centre is responsible for conducting these procedures.
- 3.2 The Test Centre will be responsible for ensuring that no material supplied to them is used for any other purpose than the conduct of these procedures or the release of reference samples for authorised purposes. (See Section E7).

4. REFERENCE VARIETIES

- 4.1 The principles governing the selection of reference varieties are set out in Appendix 1.
- 4.2 Seed of reference varieties will be supplied by the Test Centre.

5. DESIGN OF TESTS

- 5.1 The Test Centre is responsible for selecting a suitable site which should be on ground that has normally not had a white clover seed crop in the previous five years but may be less where the risk is negligible.
- 5.2 Field husbandry should follow best local practice for all operations and particularly as regards cultivation, drilling, fertiliser and spray application, use of irrigation, and control of pests and diseases.
- 5.3 From information given in the Technical Questionnaire the candidate variety may be grown in a single spaced plant test and compared with varieties which are in the same classification for the following characters, ploidy and utilisation type – forage or amenity.
- 5.4 The tests are carried out using a randomised block design, with a plot of each variety present in every block as follows:

No. of blocks	6
No. of plants per block	10
Hence, No. of plants per variety	60
Plant spacing	75 cm (approx)

The plots are arranged in the order of the sowing list in the first block. The plots are fully randomised within each of the other five blocks.

- 5.1 Seed is sown singly under glass into multipots in March/April. After establishment, the plants are moved outdoors for hardening off and transplanted in the field in July

to provide single spaced plants according to a plan produced by the Test Centre. Varieties are coded by the Test Centre.

- 5.2 At the end of the second and third recording years in September/October, any candidate varieties with serious distinctness problems are sown out in close comparison plots. These are row plots grown alongside relevant problem varieties for examination during the subsequent years.
- 5.3 For glasshouse seedling tests, a trial with thirty established plants of each variety is replicated in time by being sown at weekly intervals for six weeks, so giving 180 plants per variety in total. The plants in each trial are fully randomised.
- 5.4 Recordings are taken on each trial after approximately 8-12 weeks, depending upon the growth stage. Characters recorded are those agreed with the applicant.

6. RECORDS AND RECORDING

- 6.1 All records and plot data should be in a form determined and validated by the Test Centre.
- 6.2 Characters, recording details and instructions are given in Section D. Any variant and abnormal plants or plants resulting from an adverse reaction to husbandry practice are recorded but excluded from the sample.
- 6.3 In the first recording year, characters, as indicated in Section D5.1, are measured on all varieties and the data analysed to assess uniformity of the candidate variety and to determine the most similar reference varieties. (For details see Section G).
- 6.4 In the second recording year, characters, as indicated in Section D5.1, are measured on all varieties and the data analysed and, together with those from the first year, used to assess distinctness and uniformity of the candidate variety. (For details see Section G).
- 6.5 In the third recording year, characters, as indicated in Section D5.1 are measured on all varieties and the data analysed and, together with those from the first and second year, used to assess distinctness and uniformity of the candidate variety. (For details see Section G).
- 6.6 If the Test Centre notices unusual or novel characters in candidate varieties a note may be made of these at any time and a photographic record made.

7. COMMUNICATIONS WITH THE APPLICANT

- 7.1 The Test Centre will notify the applicant or his agent of any DUS problems at the earliest practical opportunity through preliminary (1 year) and interim (2 year) reports. All such notifications must be copied to APHA.
- 7.2 If confidentiality considerations allow, the applicant should be informed which variety is similar to his own and be invited to submit any information which may help to distinguish them.
- 7.3 If DUS problems arise, applicants will be invited to visit the DUS tests by arrangement so that the material can be examined and discussions held with the Test Centre.

- 7.4 After each recording season the results are summarised and reported to the applicant and APHA by the Test Centre.

SECTION D - SUMMARY OF DUS CHARACTERISTICS TO BE ASSESSED, METHOD OF ASSESSMENT AND STANDARDS APPLIED

1. PURPOSE

1.1 The purpose of this section is to summarise the characteristics to be assessed.

2. SCOPE

2.1 This section summarises characteristics, states of expression, method of observation and standards required for DUS assessment.

3. RESPONSIBILITIES

3.1 The Test Centre is responsible for co-ordinating the procedures in this summary.

4. ORGANISATION

4.1 The minimum duration of tests to assess characteristics should normally be three growing periods although varieties may be determined DUS after two years of tests. Shorter periods may be applied for assessment of additional characteristics. Additional growing periods may be approved by the UK National List and Seeds Committee.

5. DUS CHARACTERISTICS TO BE ASSESSED

5.1 Routine Characteristics

The following table summarises the DUS characteristics to be routinely examined:

Note: * denotes a characteristic which must be examined according to Commission Directive 2003/90/EC, the CPVO protocol and/or UPOV Guidelines.

G denotes a grouping characteristic.

D denotes a characteristic used in the variety description.

CPVO character numbers will be determined when the protocol is agreed by the Administrative Council.

CPVO	UPOV TG/38/7	UK	Character	Sample Source (Material examined)	Sample Number or size For assessment and recording	Method of Assessment And recording	States of expression	D Method	U Method UPOV TWC 11/1/16 or UNIF
3		G	Plant: ploidy				Tetraploid		
	1	1	Plant: tendency to form inflorescences before vernalisation	DUS plot	60	Visual, every plant examined	1=absent or very weak 3=weak 5=medium 7=strong 9=very strong	COYD @ 1%	COYU @ 0.1%
	2	47	Plant: intensity of green colour	DUS plot	60	Visual, every plant examined	3=light 5=medium 7=dark	COYD @ 1%	COYU @ 0.1%
	3	48	Plant: density of foliage	DUS plot	60	Visual, every plant examined	3=low 5=medium 7=high	COYD @ 1%	COYU @ 0.1%
1.2	14	8D	Leaf: length of median leaflet	DUS plot	60	Measured	1=very short 3=short 5=medium 7=long 9=very long	COYD @ 1%	COYU @ 0.1%
1.2	15	9D	Leaf: width of median leaflet	DUS plot	60	Measured	1=very narrow 3=narrow 5=medium 7=broad 9=very broad	COYD @ 1%	COYU @ 0.1%
1.4	12	13D	Leaf: length of petiole	DUS plot	60	Measured	3=short 5=medium 7=long	COYD @ 1%	COYU @ 0.1%
	13	10D	Leaf: thickness of petiole	DUS plot	60	Measured	1=very thin 3=thin 5=medium 7=thick 9=very thick	COYD @ 1%	COYU @ 0.1%
	10	49	Stem: Internode length of stolon	DUS plot	60	Measured	3=short 5=medium 7=long	COYD @ 1%	COYU @ 0.1%

CPVO	UPOV TG/38/7	UK	Character	Sample Source (Material examined)	Sample Number or size For assessment and recording	Method of Assessment And recording	Method of Assessment And recording	D Method	U Method UPOV TWC 11/1/16 or UNIF
	11	11D	Stem: thickness of stolon	DUS plot	60	Measured	1=very thin 3=thin 5=medium 7=thick 9=very thick	COYD @ 1%	COYU @ 0.1%
2	6	4D	Plant: time of flowering	DUS plot	60	Measured	1=very early 3=early 5=intermediate 7=late 9=very late	COYD @ 1%	COYU @ 0.1%
	7	5D	Plant: height	DUS plot	60	Measured	3=short 5=medium 7=tall	COYD @ 1%	COYU @ 0.1%
	8	6D	Plant: width	DUS plot	60	Measured	3=narrow 5=medium 7=broad	COYD @ 1%	COYU @ 0.1%
	20	12	Plant: number of inflorescences	DUS plot	60	Visual, every plant examined	3=few 5=medium 7=many	COYD @ 1%	COYU @ 0.1%
	21	51	Inflorescence: diameter	DUS plot	60	Measured	3=small 5=medium 7=large	COYD @ 1%	COYU @ 0.1%
	18	14	Inflorescence: length of peduncle	DUS plot	60	Measured	3=short 5=medium 7=long	COYD @ 1%	COYU @ 0.1%
	19	50	Inflorescence: thickness of peduncle	DUS plot	60	Measured	3=thin 5=medium 7=thick	COYD @ 1%	COYU @ 0.1%
		19	Inflorescence: height above canopy	DUS Plot	60	Computer derived (UK14-13)	1=very small 3=small 5=medium 7=tall 9=very tall	COYD @ 1%	COYU @ 0.1%
1.2	16	23D	Leaf: size of median leaflet	DUS Plot	60	Computer derived (UK8*9)	1=very small 3=small 5=medium 7=large 9=very large	COYD @ 1%	COYU @ 0.1%

CPVO	UPOV TG/38/7	UK	Character	Sample source (material examined)	Sample number or size for assessment and recording	Method of assessment and recording	States of expression	D Method	U Method UPOV TWC 11/1/6
	4	20	Plant: proportion of plants with cyanid glucoside	DUS plot	60	Chemical Analysis	1=absent or very low 3=low 5=medium 7=high 9=very high	COYD @ 1%	
1.1	17	21D	Leaf: ratio of length to width of median leaflet (shape)	DUS Plot	60	Computer derived (UK8/9)	3=small 5=medium 7=large	COYD @ 1%	COYU @ 0.1%
		30	Plant: volume	DUS Plot		Computer derived (UK5*6)	1=very small 3=small 5=medium 7=large 9=very large	COYD 1%	COYU @ 0.1%
	9	31	Plant: growth habit (shape)	DUS Plot		Computer derived (UK6/5)	3=semi-erect 5=intermediate 7=semi-prostrate	COYD @ 1%	COYU @ 0.1%
		32	Stem: total thickness	DUS Plot		Computer derived (UK10*11)	1=very thin 3=thin 5=medium 7=thick 9=very thick	COYD @ 1%	COYU @ 0.1%
		33	Leaf: volume of petiole	DUS Plot		Computer derived (UK10*13)	1=very small 3=small 5=medium 7=large 9=very large	COYD @ 1%	COYU @ 0.1%

CPVO	UPOV TG/38/7	UK	Character	Sample source (material examined)	Sample number or size for assessment and recording	Method of assessment and recording	States of expression	D Method	U Method UPOV TWC 11/1/6
		34	Stem: profile	DUS Plot		Computer derived (UK10/13)	3=elongated 5=medium 7=compressed	COYD @ 1%	COYU @ 0.1%
1.3	5	7G D	Plant : prominence of white leaf marks	DUS plot	60	Visual, every plant examined	1=absent or very weak 3=weak 5=medium 7=strong 9=very strong	For description purposes only	

5.2 Approved Additional Characteristics

The following table summarises the additional characteristics which have been approved by the NLSC and can be examined at the request of the applicant where necessary to establish Distinctness. A fee may be charged for examination of these characteristics, as advised by APHA.

CPVO	UPOV TG/38/7	UK	Character	Sample Source (Material examined)	Sample Number or size For assessment and recording	Method of Assessment And recording	States of expression	D Method	U Method UPOV TWC 11/1/16 or UNIF
		50	Leaf: size	Glasshouse trial	180	Leaf area meter	1=very small 3=small 5=medium 7=large 9=very large	ANOVA (t-test) @ 1% ¹	F test @ 1% ²

Note ¹ Variety means are compared using trial X variety interaction as an estimate of error variance.
² The within trial variance of the candidate variety, averaged over trials, is compared with that of a control variety.

5.3 New Additional DUS Characteristics

Applicants can suggest new additional characters on the Technical Questionnaire for testing DUS or after notification by the DUS Test Centre of distinctness problems. For procedures see Section F.

**SECTION E - REFERENCE SEED STOCK MAINTENANCE AND VCU SEED STOCK
AUTHENTICATION PROCEDURES**

1. PURPOSE

- 1.1 This section sets out the procedures for reference seed stock maintenance and VCU seed stock authentication.

2. SCOPE

- 2.1 These procedures apply to all reference collection varieties and VCU seed submissions where the VCU seed has not been taken from the same bulk as the seed used for the DUS test.

3. RESPONSIBILITIES

- 3.1 The Test Centre is responsible for conducting these procedures.

4. PROCEDURES FOR REFERENCE SEED STOCK MAINTENANCE

- 4.1 The seed sample submitted with the successful or pending application is considered to be the definitive stock of the variety. Subject to meeting the required quality standards a small portion of the seed is sown for observations and measurements. The remainder is dried and stored under controlled and monitored refrigerated conditions as part of the official reference collection.

- 4.2 If during the normal tests there is any evidence that a seed stock is deteriorating in storage, or that stocks are less than 100 grams, a request should be made to the maintainer asking for a replacement stock (750 g) of the variety. This replacement stock must be authenticated against the definitive reference sample. Plots will be established from any replacement reference seed sample to be authenticated and compared with the definitive stock over a maximum of two recording seasons.

- 4.3 If the replacement seed sample meets the required standard of no significant ($P=0.01$) differences in the first year of test using a within-year block by varieties analysis of variance of plot means or no significant ($P=0.01$) differences over two years in a COYD with MJRA analysis (see associated document UPOV TC/33/7 for details) it will be accepted as representing the variety. It may then be accepted as definitive and substituted for the existing definitive stock in the reference collection.

- 4.4 A replacement sample or additional replacement sample will be considered sufficiently uniform after one year of test, if the standard deviations of the primary measured characters are not significantly greater at the 1% ($P=0.01$) significance level than that of the mean standard deviations of the control varieties. A replacement sample or additional replacement sample will be considered sufficiently uniform after two years of test if for all primary measured characters, the combined over years uniformity (COYU) is not significantly greater at the 1% ($P=0.01$) significance level than that of the reference varieties.

- 4.5 In the event of the replacement sample not meeting the required acceptance standards, an additional replacement sample is requested. Plots will be established from any additional replacement seed sample and compared over a maximum of two recording seasons. If the additional replacement sample does not meet the acceptance criteria set out in 4.3, the variety will be deleted from the reference collection.

5. PROCEDURES FOR VCU SEED STOCK AUTHENTICATION

- 5.1 Evidence will be requested from the breeder of the relationship between the VCU seed sample and the definitive DUS seed sample. Plots will be established from any VCU seed sample to be authenticated and compared visually with the definitive stock over the recording season.
- 5.2 The plots must be examined from establishment, through flowering to maturity.
- 5.3 If the new seed sample cannot be visually distinguished from the reference stock it will be accepted as representing the variety.
- 5.4 If the VCU seed sample can be visually distinguishable from the definitive stock in the authentication plots then it will not be accepted as representing the candidate variety.

6. PROCEDURES FOR THE INCLUSION OF NEW COMMON KNOWLEDGE VARIETIES INTO THE REFERENCE COLLECTION

- 6.1 When a new variety enters into common knowledge such that it must be included in the reference collection, a request will be sent by the Test Centre to the Testing Authority which has added this variety to its National list for the supply of at least 50g of seed of the definitive sample. This seed will then be used to validate a larger sample of seed from the breeder. (The amount of seed requested will be 1500g for diploid varieties and 2000g for tetraploid varieties (see B7.1.)) The standards for this validation will be as for VCU seed stock authentication (see E5).

7. RELEASE OF REFERENCE SAMPLES FOR AUTHORISED PURPOSES

- 7.1 A maximum of 50g of seed of reference samples can be supplied by the Test Centre, on request, to UK, EU and UPOV DUS Testing Authorities and UK, EU and OECD Seed Certification Agencies, provided the recipient is notified in writing that this material, or any material derived from it, must not be supplied to a Third party or used for any other purpose than as a reference for official DUS testing or seed certification.
- 7.2 Provision of reference samples, other than in 7.1, to any other parties must be authorised by APHA.

SECTION F- PROCEDURES FOR ASSESSMENT OF NEW ADDITIONAL DUS CHARACTERS

1. PURPOSE

- 1.1 This Section sets out the procedures for assessment of new additional DUS characters for varieties of White clover entered for National List trials and PBR.

2. SCOPE

- 2.1 These procedures apply to applications where new additional DUS characteristics which have not been approved by the NLSC are requested for use for determinations of DUS.

3. RESPONSIBILITIES

- 3.1 The Test Centre is responsible for liaising with the applicant to produce a proposed procedure for the conduct of new tests. This procedure must ensure that Distinctness, Uniformity and Stability will be assessed.
- 3.2 All new additional characteristics must be authorised by the National List and Seeds Committee.

4. REFERENCE VARIETIES

- 4.1 The reference varieties will include only those varieties from which the candidate variety is not distinct, as well as other appropriate varieties for control purposes.
- 4.2 Seed of reference varieties will be supplied by the Test Centre.

5. PROCEDURES

- 5.1 Details of the proposed special test or assessments will be submitted to the NLSC to consider the feasibility of setting up a test acceptable to the UK Authorities. The applicant will be advised by APHA of arrangements and costs.
- 5.2 The NLSC will consider the results of the commissioned test or trial when reaching its recommendation on the granting of Plant Breeders' Rights and/or National Listing.
- 5.3 Where the test for a character is approved by the NLSC it should be subsequently listed in Section D5.1 or 5.2 as appropriate.

SECTION G - PROCEDURES FOR DUS DECISIONS**1. PURPOSE**

- 1.1 This section sets out the procedures for assessing DUS decisions on varieties of White clover.

2. SCOPE

- 2.1 These procedures apply to all varieties of White clover entered for National List and Plant Breeders' Rights tests and those being tested for Foreign Authorities.

3. RESPONSIBILITIES

- 3.1 The Test Centre is responsible for applying the criteria for DUS, set out in this procedure.
- 3.2 The Test Centre is responsible for producing the DUS reports in accordance with these procedures and for ensuring that they are in accordance with the UPOV Guidelines.

4. REFERENCE VARIETIES

- 4.1 Appendix 1 sets out which varieties are considered as reference varieties for these procedures.
- 4.2 A system of cyclic planting of reference varieties in two years out of every three years is used, with the data for the missing year compensated for by the use of historic data from two earlier years. *Please see associated document Plant Varieties and Seeds (2001) 14, 1-14 for details.*

5. DISTINCTNESS

- 5.1 In accordance with associated document UPOV TG1/3 varieties can be considered distinct where they have a different expression in a grouping character e.g. ploidy and utilisation type.
- 5.2 The standard applied for distinctness over two years of test is a significant difference at 1% ($P = 0.01$) significance level in at least one character in a combined over years distinctness (COYD) with Modified Joint Regression (MJRA) analysis. Please see associated document UPOV TC/33/7 for details.
- 5.3 The standard applied over three years of test is a significant difference at the 1% ($P = 0.01$) in at least one character in a combined over years distinctness (COYD) with Modified Joint Regression (MJRA) analysis. Please see associated document UPOV TC/33/7 for details.
- 5.4 A two-tier system is used for assessing distinctness. This determines the characteristics for which a variety must also be uniform. The varieties are examined first for distinctness using only the primary measured characters. The varieties which are not distinct are then re-examined using secondary computer-derived characteristics. A variety must be uniform in all primary measured characters. However, if a secondary computer-derived characteristic is necessary for distinctness in a variety, then the variety must also be uniform in that characteristic.

5.5 Where varieties are grown in close proximity under the same conditions, and a direct comparison can be made, observations can be made on differences not revealed by single spaced plant trials and further observations on single spaced plant trials or special tests can be undertaken.

6. UNIFORMITY

6.1 Uniformity is assessed for all characteristics used to establish Distinctness.

6.2 Any outlier plants (off-types) are identified by the analysis and decisions taken by the Test Centre on whether they should be excluded or not from the calculation of variety means and standard deviations. Off-type plants in the field are identified by visual assessment and are marked for a decision on omission for recording depending upon incidence across replicates.

6.3 After the variants have been excluded, the characteristics listed in Section D5 are used to assess the uniformity of the remaining plants, according to the methods of Combined Over Years Uniformity (COYU) analysis described in associated document UPOV TC/33/7.

6.4 A variety can be considered sufficiently uniform after two years of tests if, for all primary measured characters and any secondary computer-derived characters necessary for distinctness, the combined over years uniformity (COYU) is not significantly greater than that of the reference varieties at the 1% ($P=0.01$) significance level. In all cases an examination of data from individual years is carried out to investigate the COYU result should this reveal potential uniformity problems.

6.5 A variety is considered sufficiently uniform after three years of tests when, for all primary measured characters and any secondary computer-derived characters required for distinctness, the combined over years uniformity (COYU) is not significantly greater than that of the reference varieties at the 0.1% ($P=0.001$) significance level. In all cases an examination of the data from individual years is carried out to investigate the COYU result should this reveal potential uniformity problems.

7. STABILITY

- 7.1 A variety is considered sufficiently stable when there is no evidence to indicate that it lacks uniformity or fails to conform to the essential characteristics of its description in different submissions or in different tests.

8. DUS REPORT AND VARIETY DESCRIPTION

- 8.1 Upon completion of the DUS examination the DUS Summary report will be submitted to APHA by the specified date. This report will specify all non-routine characteristics for establishing distinctness.
- 8.2 The final DUS report, including the full variety description, will be submitted to APHA by the specified date. The characteristics to be used in the description are identified in Section D.

APPENDIX 1**REFERENCE COLLECTION VARIETIES****1. NATIONAL LISTING**

- 1.1 The DUS reference collection, for NL purposes, for any given category of plant variety comprises the following at the time when the application for the candidate is made:
- 1.1.1 All other candidate varieties already in DUS test in the UK, or entering testing at the same time as the candidate, including those being tested for other Member States.
 - 1.1.2 All varieties on the UK National List and varieties on the EC Common Catalogue whose seed is known to be certified or marketed in the UK.
 - 1.1.3 Varieties nominated by the authorities concerned where tests are done for other Member States.
 - 1.1.4 Any varieties nominated by the applicant as being comparable i.e. known to be similar.
 - 1.1.5 Any other varieties considered to be comparable i.e. known to be similar by the appropriate Test Centre or DUS Centre Group.

2. PLANT BREEDERS RIGHTS

- 2.1 The DUS reference collection, for PBR purposes, for any given category of plant variety comprises the following at the time when the application for the candidate is made:
- 2.1.1 All other candidate varieties already in DUS tests in the UK, or entering DUS testing at the same time as the candidate, including those being tested for other Member States or the Community Plant Variety office (CPVO).
 - 2.1.2 Varieties protected in the UK, EC or in a UPOV Member State, which are known to be similar to the candidate variety.
 - 2.1.3 Other available comparable varieties in common knowledge.