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TELECOMMUNICATIONS, EXCHANGEABLES OF SOFTWARE AND CONTACTS

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TELECOMMUNICATIONS, EXCHANGEABLE SOFTWARE AND CONTACTS

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The following is a key to the working papers of the UPOV Technical Working Party on Automation and Computer Programs. The papers are the contributions of individuals to the development of UPOV technical procedures and do not represent agreed positions by UPOV or any of its advisory committees. The papers are grouped by subject matter:

Distinctness
Uniformity
Identifying similar varieties
Sequential acceptance sampling
Visually scored data
Image analysis
Biochemical and molecular data
Miscellaneous

The reference number is that assigned by the UPOV office and can be used to identify the paper. The group column refers to the crop which is addressed in the paper, A - agriculture; V - vegetables; F - fruit; O - ornamental and forest tree. A dash indicates that the paper deals with general issues. Papers are ordered with most recent papers appearing first.

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07/08	-	Use of COY and MJRA when regressions are significant	Weatherup	18.01.89
07/06	-	Estimated minimum distances from small data sets	Talbot	28.02.89
07/03	-	Comparison of the COY analysis with the 2X1% method	Gregoire	30.01.89
06/11	V	Over years criterion distinctness on onion data	Laidig	24.05.88
06/10	-	Close pair comparison and COYD criterion	Talbot	02.05.88
06/08	-	Comparison of distinctness methods	Kristensen	15.04.88
06/07	-	Evaluation of COY distinctness criterion with data from 1985 to 1987	Laidig	09.03.88
06/06	A	Evaluation of COY criterion by regression in UK	Weatherup	15.04.88
05/05	A	COYD criterion after 3 years and 2 years of test	Weatherup	08.05.87
04/08	-	Evaluation of over-years COY distinctness criterion in UK	Weatherup	03.04.86
04/07	-	Interpretation of over-years results	Baltjes	01.05.86
04/06	A	Distinctness problems in grasses and sugar beet	Kristensen	26.03.86
04/05	-	Comments on use of COY criterion from member states	Weatherup	29.04.86
03/08	-	Simulation of the combined-over-years analysis	Baltjes	28.03.85
03/07	-	Experience in over-years distinctness criterion in UK	Weatherup	27.03.85
03/06	A	Experience in over-years distinctness criterion in UK	Weatherup	27.03.85
03/05	A	Over-year criterion (D) after two years of testing	Weatherup	14.03.85
03/03	-	Comparison of interpretation of DUS in different countries	Royer	05.02.85
02/05	A	Combined over-years criterion for distinctness on herbage crops	Weatherup	10.04.84

UNIFORMITY

19/07	A	Review of UK Uniformity Standards for Grasses age	experts from UK	07.05.01
19/05	A	Methods for testing Uniformity on characters where the data has been bulked	expert from Denmark	11.05.01
18/02	A	Use of COY-D and COY-U approach in more than one location in forage crops	Gregoire	09.05.00
18/07	-	Design and Analysis of DUS special tests	Talbot	16.05.00
18/10	-	The combined-over-years- distinctness and uniformity criteria (revised paper TWC/15/7)	Talbot, Watson	19.05.00
18/12	V	Population standards in hybrids of outbreeding species	Roberts	?
15/15	-	Balanced alpha and beta risks tables (single sampling)	del Fresno	13.05.97
15/12	-	Testing of homogeneity of self-fertilized and vegetatively propagated species using off-types	Kristensen	13.05.97
15/07	-	Users notes for COYD and COYU procedures	Talbot, Watson, Weatherup	09.05.97
15/06	-	Use of COYD and COYU	Law	13.05.97
14/03	-	Testing of uniformity of self-fertilized and vegetatively propagated species using off-types	Kristensen	02.05.96
14/09	-	A tool to supply tables for document TWC/11/16 and to find correct population standards for different sample sizes and off-types	del Fresno	13.05.96
14/11	-	Summary of the answers to the questionnaire addressed to the crop experts in order to know their opinion on the way of fixing the population standard for each crop	Blouet	29.05.96
13/09	A	Homogeneity criterion for visually assessed characteristics in turnip rape	Talbot	18.04.95
13/08	-	Homogeneity testing over more than one year	Kristensen	18.04.95
12/11A6	-	Comparison of two years uniformity tests in DK	Kristensen	12.04.94
12/11/A10	-	Testing of uniformity by two-stage sampling	Laidig	12.04.94
12/10	A	Use of COYU in the UK in 1993	Weatherup	12.04.94
11/10	-	Evaluation of over-years criterion for uniformity	Kristensen	17.06.93
11/09	-	Comparison of conclusions drawn from COYU analysis	Falkenberg	25.05.93
11/06	A	Use of COYU in the UK	Weatherup	11.05.93
11/02	-	The combined-over-years uniformity criterion	Talbot	11.05.93
10/09	-	Minimum sample size in self-pollinated and vegetatively propagated species	van der Heijden	19.05.92
10/07	-	Study of COYU levels	Fuchs	14.05.92
10/05	-	Testing homogeneity of self-fertilized or vegetatively propagated varieties	van der Heijden	11.05.92
9/11	-	Study of COYU levels in Denmark	Kristensen	29.05.91
9/08	-	Evaluation of COYU criterion	Laidig	22.05.91
9/06	A	COYU analysis applied to Italian ryegrass and red fescue	van der Heijden	17.05.91
9/05	A	Comparison between COYU criterion and present criterion in PRG varieties	Weatherup	03.05.91
8/08	-	Evaluation of over-years criterion for uniformity	Gregoire, Talbot	22.05.90
07/17	-	Comparison between COY uniformity decision and present UPOV criterion	Weatherup	25.04.89
07/12	-	Evaluation of over-years homogeneity criterion and significance level	Laidig	17.04.89
07/04	-	Testing homogeneity of self fertil and vegetativ propag pecies	Laidig	30.01.89

06/09	-	The over-years uniformity criterion	Talbot	02.05.88
06/04	-	Testing homogeneity of self-fertilized plants	Weatherup	15.04.88
05/06	-	COY uniformity for cross-pollinated species	Talbot	15.05.87
04/10	-	Over-years uniformity criterion for cross-pollinated species	Talbot	30.04.86
04/09	-	Questionnaire on uniformity standards vege. propag. and self-pollinated species	Weatherup	30.04.86
03/10	-	Uniformity standards for cross-pollinated pecies	Talbot	29.03.85
02/03	-	Homogeneity comparison between UK and UPOV criterion	Weatherup	12.03.84

IDENTIFYINGSIMILARVARIETIES

17/12	A	Special application of DUS variety descriptions	Veress	29.07.99
15/13	A	Constructing a reference set of cultivars for testing distinctness	Keizer, van Eeuwijk	25.06.97
14/2	-	Application of Gower's similarity coefficient to detect most similar varieties	Pilarczyk	26.03.96
14/14	-	Similarity, clustering and dendrograms	Law	04.06.96
13/06	A	Evaluation of most similar variety	Weatherup	18.04.95
9/07	-	Calculating similarities between varieties using electrophoresis data	van der Heijden	17.05.91
9/02	-	Review of methods for determining the most similar variety	Weatherup	29.05.91
8/15	-	Identification of similar varieties	Campbell	07.08.90
8/11	-	Variety description identification of similar varieties	Campbell, Fuchs	21.05.90
8/07	-	Dissimilarity between varieties with non-continuous measurements	Weatherup	04.05.90
8/06	-	Methods for identifying similar varieties	Weatherup	09.04.90

SEQUENTIALACCEPTANCESAM PLING

14/4	-	Acceptance probability curves to define an appropriate sample scheme	Gregoire	17.05.96
14/17	-	Qalstat software	Gregoire	04.06.96
13/17	-	Sequential analysis	Gregoire	18.04.95
12/11A9	-	Introduction to sequential acceptance sampling	Talbot	12.04.94
07/09	-	Evaluation of the most similar variety using generalised distances	Weatherup	23.01.89
06/05	-	Choice of most similar variety for description	Weatherup	5.04.88

BIOCHEMICALANDMOLECULARDATA

18/08	-	Comments on the sixth session of the working group on biochemical and molecular techniques and DNA profiling in particular (BMT), Angers, France, March 1 to 3, 2000	Law	16.05.00
16/13	A	Most similar variety : comparisons of morphology, pedigree and molecular	Law, Cooke	18.05.98
15/16	A	Identification of ryegrass cultivars by means of AFLP markers	-	27.05.97
14/15	-	The use of the analysis of molecular variance (AMOVA) for distinction studies	Dillman	29.05.96
14/18	-	Statistical analysis of molecular marker data	Talbot	04.06.96
13/15	-	Application of statistical analysis	Howath	18.04.95

		to small sample electrophoretic tests		
9/07	-	Calculating similarities between varieties using electrophoresis data	van der Heijden	17.05.91
8/03	-	Common data structure for electrophoretic data	Gregoire	20.04.90
07/15	-	Computer program for analysing electrophoresis data in Germany	Laidig	07.04.89
07/02	-	Review of statistical practice in analysis of electrophoresis data by computer	Gregoire	23.01.89

IMAGEANALYSIS

16/11	V/O	Digital images in plant variety variety testing	van der Heijden	18.05.98
16/10	V	Visor - a plant variety image database	Horgan, Talbot, Davey	18.05.98
13/18	-	Answers to questionnaire on IA	van der Heijden	8.04.95
13/16	-	Image recognition system for plant variety testing	van der Heijden	18.04.95
13/10	V	Plant variety color assessment using a still video camera	Horgan, Talbot, Davey	18.04.95
12/09	O	Application of image analysis to varietal characterisation	Gandelin	07.04.94
12/06	-	Image analysis in variety testing	van der Heijden,	30.03.94

VISUALLYSCORED DATA

17/14	-	Application of a threshold model on a number of UPOV characteristics	Thissen	20.08.99
17/06	-	Handling visually assessed data	Meyer	27.05.99
15/14	A	Revised document on analyzing visually observed data in two grass species	van Eeuwijk	05.06.97
14/12	-	Threshold models for visually-observed data	van Eeuwijk	4.06.96
13/14	V	Biometrical evaluation of visually observed characteristics in French beans	Laidig	18.04.95
11/13	-	Handling of visually assessed characteristics	Laidig	17.06.93
10/08	-	Handling of visually observed characteristics	Laidig	19.05.92
05/04	-	Logical order of states of expressions	Weatherup	17.02.87

MISCELLANEOUS

19/10	-	Good statistical practices in DUS Testing. Types of characteristics and their scale levels	Expert from Germany	09.05.01
19/08	-	DUST for Windows DUSTNT Report on developments	Expert from UK	15.05.01
19/06	-	Design and analysis of DUS special Tests	Expert from UK	09.05.01
19/04	-	Spatial dependency and block design	Expert from UK	07.05.01
19/02	-	Three-stage testing testing uniformity of varieties of self-fertilized plants in DUS trials	Expert from Poland	07.04.01
18/02	-	Types of characteristics and their scale levels	Meyer	18.05.00
18/09	-	Types of characteristics and their scale levels	Meyer	18.05.00
18/11	-	Telecommunications, exchangeable software and contacts	Talbot	22.05.00
17/02	A	Efficiency of IB design in DUS trials	Pilarczyk	17.03.99

17/03	-	UPOV DUS & VCU computer systems	Pilarczyk	10.05.99
17/04	-	Developments in telecommunications	Talbot	28.05.99
17/05	O	Flores : image database for ornamentals	van der Heijden	28.05.99
17/09	-	DUST for Windows	Watson	02.06.99
16/06	-	UPOV TWC WWW Information pages	Talbot	16.05.98
16/05	-	Email bulletin board for varieties and seeds technical matters	Talbot	16.05.98
15/11	-	UPOV and the Internet	Talbot	07.05.97
15/04	A	Spatial dependence in spaced plant herbage trials	White	29.04.97
13/04	A	Checking for outliers in herbage DUS data	Weatherup	06.04.95
9/10	-	Between centre standardization of variety descriptive scores	Kristensen	29.05.91
9/09	-	Variety testing by breeder	Adriansen	20.05.91
07/07	-	Deriving variety scores from continuous measurements	Talbot	31.01.89
06/03	-	Non parametric statistics for DUS testing	Baltjes	23.03.88
06/02	-	Promoting statistics	Baltjes	29.02.88
04/12	-	Variety description	Law	22.05.86
03/09	-	Exchange of variety descriptions	Law	28.03.85
02/04	-	Standardization of entries	Duyvendak	10.04.84

EXCHANGEABLESOFTWARE

CZECHREPUBLIC

ProgramName	Function	Programming Language	AvailableFrom
FTAB-MAX	<p>Spreadsheetwithstatisticalfunctions,forexample:</p> <ul style="list-style-type: none"> *Findingmost similarvarieties,basedoneuclidiandistancefrom atargetvarietyinastandardisedmultidimensionalspace; *Multidimensionalgroupingofvarieties(hierarchicalsorting) basedoncategoricaldescriptorvalues.Stopswhendistinctionof allentriesis reached; *LeastSquaresAnalysisofnonorthogonaldata,includingleast significantdifferencesforaveragenumberofreps; *Simplestatisticsofspecifiedrowsorcolumns; *Multidimensionaldistinctnessofmeasuredvariables of replicatedentries(com binedoverenvironments); *Correlationmatriceswithindicatedsignificance; *Two -dimensionalscatterdiagrams. 	CompiledBASIC	Dr.E.Schwarzbach Brno

DENMARK

ProgramName	Function	Programming Language	AvailableFrom
	DenmarkusesSASonPcsfor calculationofdatafrombothDUS andVCUtrials.Administrative dataarestoredand retrievedfrom adatabase developedinFOXPRO(DbaseIV -like)onPcs.Macros inSASareavailablewhichconvertSASdatasetstofileswhich canbereadbyDUSTandrelatedpr ograms. ProceduresusingSAScanbecopiedbyotherSASusers.	SAS	K. Kristensen Denmark
SAS-SUMMARY	Calculatessummarymeasures.		
SAS-ANOVA	Calculatesanalysesofvariance,varietymeansandSLDvalues.		
SAS-GLM			
SAS-PLOT	Residualplotsandplots ofstandarddeviationsagainstplot numberand/or means.		
SESENS	ConvertSAS -filestoascii -fileswhichcanbeusedasinputfor UNIF3(Fortranuniformityprograms suppliedbyMTalbot).		
SESSELV	ConvertSAS -filestoascii -fileswhichcanbeusedasinputfor TVALandTSUM(Fortrandistinctnessprogramswhicharepart oftheDUSTprograms suppliedbySTCWeatherup).		

GERMANY

Program Name	Function	Programming Language	Available From
SAS -COY D	-Distinctnesstestsforcandidatevarietieswith3,2 or1yearoftrialresults.CalculationofANOVA summarystatistics,MJRA, LSD -values,outlier checking,residualplots,summarytableof distinctnessresults,similarvarieties.Options: longrangeLSDvalues,robustestimateoferror meansquare.	SAS	Bundessortena mt, Hanover
SAS -COY H	-Homogeneitytestforcandidatevarietieswith3 and2yearsoftrialresults.Functionsandoutput asdescribedindocumentTC/30/4(COY -U).	SAS	Bundessortena mt, Hanover
VERA	Generatesrandomizeddesignsforvariety trials withupto225entries:completeblocks,with entriesarrangedingroups(e.g.maturity),split plots(2factors),splitplotswheresubplotsare arrangedinanalphadesign.	SAS	Bundessortena mt, Hanover

JAPAN

ProgramName	Function	Programming Language	AvailableFrom
KIRI	Generaldatabasesoftwarewhichcontainsinformationon applications(suchasnameandaddressofapplicant,generaand speciesofvariety,proposeddenomination,dateofapplication etc.)andregistration(denomination, dateofregistration, characteristicsofregisteredvarietyetc.).	C	Seeds and Seedlings Division, MAFF,TOKYO

THE NETHERLANDS

ProgramName	Function	Programming Language	AvailableFrom
Handheld terminal	ProgramsonhandheldterminalsHuskyFS/2for field observationswithchecksondata.	MS-DOS TurboPascal VAXFortran	GerardMiddendorp CPRO-DLO, POBox16 6700AA Wageningen TheNetherlands
CIS	OracledatabasewithapplicationsforDUSandVCUtrialsdata storageandanalysis.	Designer2000	GerardMiddendorp CPRO-DLO
Genstat Procedures	Asuiteofdedicatedproceduresforanalysisofvarietydatafrom theCISdatabase.	Genstat4.1	GerardMiddendorp CPRO-DLO
SCIL-Image	ImageanalysispackagewithC -commandinterpreter,menu's, easilyexpandablelar gelibraryofimagingfunctions.	C	Geriev.dHeijden CPRO-DLO

POLAND

ProgramName	Function	Programming Language	AvailableFrom
POWT3	Analysisofcategoricaldata;thedifferencebetweenallpairsof varietiesarettested.	FORTRANF1	W.Pilarczyk COBORU Poland
POWT5	Analysisofvarianceforcumulativeobservationsoveraperiodof time.Programcanbeused,forexample,fortheanalysisof headingdatesandforsocalled"dynamicsofflowering".	FORTRANF1	

SLOVAKIA

PROGRAM NAME	Function	Programming Language	AvailableFrom
ANALIST1.1	IdentificationofwheatvarietiesusingImageAnalysisof16 morphometricalparametersofwheatseeds,compare morphometricalparametersoftestedsamplewithstandard parametersofreferencevarieties(fromcatalogue), computethe similarityofvarietiesandrakingofvarietiesbylevelof homologyoftheirshapes.	PASCAL6.0	Mr.Lubomír Horváth Fax:0042 07 821763 Slovakia
ANALIST2.1	IdentificationofbeanvarietiesusingImageanalysisof16 morphometricalparameter sofbeanseeds,compare morphometricalparametersoftestedsamplewithstandard parametersofreferencevarieties(fromcatalogue),computethe similarityofvarietiesandrakingofvarietiesbyleveloftheir homologyofshapes.	PASCAL6.0	
ANALIST3 .1	Identificationofindividualspeciesofplantseedsandadmixtures intestedsamplesusing5morphometricalparameters.	PASCAL6.0	
SPECTRUM1.1	Identificationofvarietiesusingelectrophoresisanddensitometric data.Standardizationofelectrophoret icspectraby3reference bands,computerelativehomologyoftestedandcatalogized spectraandrakingofspectrabylevelofrelativeweighted homology.	CLIPPER5.0	

UK

ProgramName	Function	Programming Language	AvailableFrom
DUST	GeneralprogranforanalysisofdatafromDUStrials.Includes facilitiesforCOYanalysisandawiderangeofmultivariate analysistechniques.Thesoftwarepackageiscurrentlyavailablein aDOS -basedversion(DUST9)andinaWindows95/NTversion (DUSTNT).	FORTRAN90	DrSWatson DARD BELFAST

The DUST Software Package

The DUST system was developed specifically to meet the needs of DUS (Distinctness, Uniformity and Stability) testing stations for software, to organise, analyse and report data from DUS field trials. DUST is in routine use at several DUS centres for the management of data from trials of grasses, legumes, vegetables and fodder crops. It incorporates many of the UPOV recommended statistical procedures for these crops. The DUST package handles data through the stages of collection, storage, single-year summary, and multi-year summary. As well as providing the UPOV recommended procedures, it includes facilities for:

- identifying most similar varieties based on observations from a number of characters;
- producing variety descriptions.

The DUSTNT system will run on Pentium PCs. The minimum specification of PC needed to run the software is a 486 DX processor with 36 mbyte of memory. For further information and details of availability please contact:

Dr Sally Watson
 Biometrics Division
 Department of Agriculture and Rural Development for Northern Ireland
 Newforge Lane, Belfast BT9 5PX, UK
 Tel: (44) 2890 255 292
 Fax: (44) 2890 681 216
 Email: sally.watson@dardni.gov.uk

THE COMBINED -OVER-YEARS DISTINCTNESS CRITERION

SUMMARY

To distinguish varieties on the basis of a measured character, we need to establish a minimum allowable distance between varieties so that a pair of varieties showing a difference greater than the minimum might be regarded as 'distinct' in respect of that character. There are several possible ways of establishing minimum distances from Distinctness, Uniformity and Stability (DUS) trials data. Here is described what is known as the Combined -Over-Years Distinctness (COYD) criterion.

The COYD method involves:

- for each character, taking the variety means from the two or three years of trials for candidates and established varieties and producing over-year means for the varieties;
- applying the technique of analysis of variance to the variety-by-years table in order to calculate a least significant difference (LSD) for comparing variety means;
- if the over-years mean difference between two varieties is greater than the LSD then the varieties are said to be distinct in respect of that character.

The main advantages of the COYD method are:

- it combines information from several seasons into a single criterion in a simple and straightforward way;

- it ensures that judgements about distinctness will be reproducible in other seasons; in other words, the same genetic material should give similar results within reasonable limits from season to-season.
- the risks of making a wrong judgement about distinctness are constant for all characters.

THE COMBINED -OVER-YEARS UNIFORMITY CRITERION

SUMMARY

When the uniformity of plants of a variety is to be judged on the basis of measurements then the standard deviation (SD) can be used to summarise the spread of the observations. A new variety can then be tested for uniformity by comparing its SD with that of reference varieties. However, uniformity is often related to the expression of a character. For example, in some species varieties with larger plants tend to be less uniform in size than those with smaller plants. If the same standard is applied to all varieties, then it is possible that some may have to meet very strict criteria while others face standards which are easy to satisfy.

The Combined -Over-Years Uniformity (COYU) criterion addresses this problem by adjusting for any relationship that exists between uniformity, as measured by the plant to-plant SD, and the expression of the characteristic, as measured by the variety mean, before setting a standard.

The technique involves ranking reference and candidate varieties by the mean value of the character. Each variety's SD is taken and the mean SD of the varieties most similar, i.e. those varieties which are ranked with it most closely, is subtracted. This procedure gives for each variety a measure of its uniformity expressed relative to that of comparable varieties. The results for each year are combined by forming a variety -by years table of adjusted SDs and applying an analysis of variance. The mean adjusted SD for the candidate is compared with the mean for the reference varieties using a standard t-test. COYU, in effect, compares the uniformity of a candidate with that of the reference varieties most similar in relation to the character being assessed. The main advantages of COYU are that all varieties can be compared on the same basis and that information from several years of testing may be combined into a single criterion.

DATABASE MANAGEMENT SYSTEMS IN USE

Name	Hardware -OS	Data used	Interface
Oracle	VaxII -VMS(NL) DecAlpha -VMS(UK) Sequent -Dynix(UK) Sun -Solaris(UK) Axil -Solaris(FI) PC -WindowsNT(F,UK)	Variety(F,FI,NL,UK) SeedCert(FI,NL,UK) Administrative(F,NL,UK) Photo/slides/herbarium(NL)	Fortran,Pascal,Cobol,C, SQL/NTServers, Developer2000, VBA,Access,WP packages

Name	Hardware -OS	Dataused	Interface
Informix	Hewlett-Packard -HPUX (D)	Admin+Technical(D)	Fortran,C,SAS; VBAlinksto Word/Excel
dBaseIII+	PC -Dos(ES) PC(SK)	Technical(ES,SK) Admin(ES,SK)	AssemblyLanguageonly
FoxPro2	PC -Windows(CZ)	Admin+variety(CZ)	MSOffice, dBase,Fortran
VisualFox Pro	PC -WindowsNT(CA) PC -Windows(DK)	Admin(CA) Admin+variety(DK)	WordPerfect,MSOffice FoxExpress
RDB	VAX4300 -VMS(F)	Admin+Technical(F)	-
IDSMA	ICLS39VME(PL)	Admin+Variety(PL)	COBOLApplication Master
Progress	Axil -Solaris(FI)	Admin(FI)	Sylk
MSAccess	PC -Windows(D,F,SK, UK)	Technical(D,F,SK,UK) Admin(F,SK,UK)	-
MSExcel	PC -Windows(HU)	Admin+Tech+Variety (HU)	VBA

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