TWC/32/21 Add.
ORIGINAL: English
DATE: June 12, 2014

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY ON AUTOMATION AND COMPUTER PROGRAMS

Thirty-Second Session
Helsinki, Finland, June 3 to 6, 2014

ADDENDUM

REVISION OF DOCUMENT TGP/8: PART II: SELECTED TECHNIQUES USED IN DUS EXAMINATION, NEW SECTION: STATISTICAL METHODS FOR VISUALLY OBSERVED CHARACTERISTICS

Document prepared by an expert form Finland

Disclaimer: this document does not represent UPOV policies or guidance

The Annex to this document contains a copy of a presentation on a comparison of the results on distinctness decision between the COYD method for ordinal characteristics and $\chi 2$-test that will be made at the Technical Working Party on Automation and Computer Programs (TWC), at its thirty-second session.

[Annex follows]

REVISION OF DOCUMENT TGP/8: PART II: SELECTED TECHNIQUES USED IN DUS EXAMINATION, NEW SECTION: STATISTICAL METHODS FOR VISUALLY OBSERVED CHARACTERISTICS

A COMPARISON OF THE RESULTS ON DISTINCTNESS DECISION BETWEEN THE COYD METHOD FOR ORDINAL CHARACTERISTICS AND X2-TEST

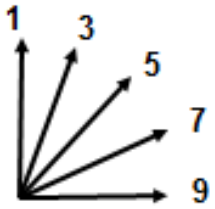
UPOV TWC 32nd meeting

Helsinki 3-6.6.2014

Growth habit of meadow fescue (TG/39/8)

- Visually observed characteristic with order

- The angle formed by the imaginary line through the region of greatest leaf density and the vertical should be used



note 2

note 4

note 7

Example data
Year 2012

2012	1	2	3	4	5	6
CANDIDATE A	2	20	25	5	6	1
CANDIDATE B		20	21	11	5	
C		24	21	7	6	1
D	2	17	25	14	5	
E	1	22	26	6	1	
F		11	14	15	18	1
G		29	25	4	1	
H	5	26	21	4	1	
I	1	20	21	6	9	
J		15	27	12	6	
K		16	14	15	15	2
L	5	20	26	6	5	
M		16	22	15	6	
N		10	24	9	14	1
O		19	29	10	1	
P	2	25	32	5		
Q	1	24	24	6	2	
R		24	26	6	1	
S	1	16	27	11	4	
T		19	24	7	7	
U	2	17	31	6		
V	1	12	24	5	15	
W		14	17	15	15	
X	2	24	24	6	2	
Y		20	26	11	5	
Z	2	24	27	4		
1	5	32	16	5		1
2		22	30	6	2	
3	1	19	17	15	7	
4	1	17	26	9	2	
5		14	26	16	4	

Criteria for χ2-test

- p-value 0,05, traditionally used in Finland , Yate's correction not used (>2 classes)
- Variety pairs distinct in at least 2 out of 3 years
- Direction check of the order before decision
- 20% of the expected frequencies shouldn't be under 5 and always >1, therefore fusion of classes needed

χ2-test, data analysis

2012	1-2	3	4	5-6						
Cand A	22	23	5	9	59	16.5	18.5	10	14	
F	11	14	15	19	59	16.5	18.5	10	14	0.0024
	33	37	20	28	118					
2011	2-3	4	5-6							
Cand A	29	23	2	54	21.5	22.5	10			
F	14	22	18	54	21.5	22.5	10	0.0001		
	43	45	20	108						
										D
2010	2-4	5	6-7							
Cand A	5	32	4	41	5.369	28.798	6.8333			
F	6	27	10	43	5.631	30.202	7.1667	0.2187		
	11	59	14	84						

UPOV TWC 32 3.-6.6.2014 Helsinki

Comparison of the methods

Amount of D varieties:

	χ2-test	COYD
Cand A	6 (20%)	11 (36%)
Cand B	3 (10%)	10 (33%)

In Average COYD for ordinal Characteristics separated Separated 20% more varieties From candidates than the χ2-test.

Ref.	CANDIDATE A			Distinct	Distinct	CANDIDATE B			Distinct	Distinct
Variety	2010	2011	2012	by χ2-	by COYD	2010	2011	2012	by χ2-	by COYD
Cand A	-	-	-	no	no	0,02 (*	0,38	0,31	no	no
Cand B	0,02 (*	0,53	0,31	no	no	-	-	-	no	no
C	0,68	0,16	0,86	no	no	0,31	0,12	0,67	no	no
D	0,24	0,04 (*	0,06	no	no	0,25	0,74	0,88	no	no
E	0,005	0,07	0,07	no	D	0,0005	0,45	0,09	no	D
F	0,04 (*	0,0001	0,002	D	D	0,74	0,002	0,005	D	D
G	0,01	0,64	0,06	no	no	0,14	0,80	0,02	no	no
H	0,00002	0,0003 (*	0,03	D	D	0,0006 (*	0,16	0,01	no	D
I	0,40	0,77	0,85	no	no	0,01	0,33	0,66	no	no
J	0,34	0,21	0,16	no	no	0,01	0,17	0,68	no	no
K	0,13	0,001	0,04	D	D	0,43	0,09	0,07	no	D
L	0,14	0,40	0,27	no	no	0,15	0,76	0,65	no	no
M	0,18	0,33	0,21	no	no	0,39	0,07	0,95	no	no
N	0,09	0,0005	0,07	no	D	0,28	0,04 (*	0,03	no	D
O	0,007 d	0,005 (*	0,02 d	no	no	0,02	0,65	0,26	no	no
P	0,001 (*	0,0004	0,01	D	D	0,001	0,09	0,002	D	D
Q	0,01	0,51	0,15	no	no	0,03	0,42	0,48	no	no
R	0,26	0,54	0,08	no	no	0,33	0,42	0,17	no	no
S	0,007 (*	0,15	0,16	no	no	0,03	0,24	0,78	no	no
T	0,22	0,001	0,85	no	no	0,46	0,46	0,69	no	no
U	0,0008	0,01 (*	0,08	no	D	0,007	0,58	0,18	no	D
V	0,30	0,004 (*	0,40	no	D	0,66	0,39	0,06	no	D
W	0,15	0,03	0,04	D	no	0,24	0,22	0,13	no	no
X	0,02 (*	0,009 (*	0,13	no	no	0,01 (*	0,67	0,45	no	no
Y	0,47	0,35	0,14	no	no	0,20	0,63	0,82	no	no
Z	0,04 (*	0,02 (*	0,04	no	D	0,01 (*	0,37	0,01	no	D
1	0,004	0,0001	0,02	D	D	0,02	0,14	0,09	D	no
2	0,39	0,15	0,14	no	no	0,39	0,43	0,22	no	no
3	0,32	0,22	0,10	no	D	0,04	0,32	0,72	no	D
4	0,17	0,01	0,09	no	no	0,13	0,47	0,46	no	no
5	0,45	0,42	0,04	no	no	0,73	0,17	0,47	no	no

UPOV TWC 32 3.-6.6.2014 Helsinki

[End of annex and of document]