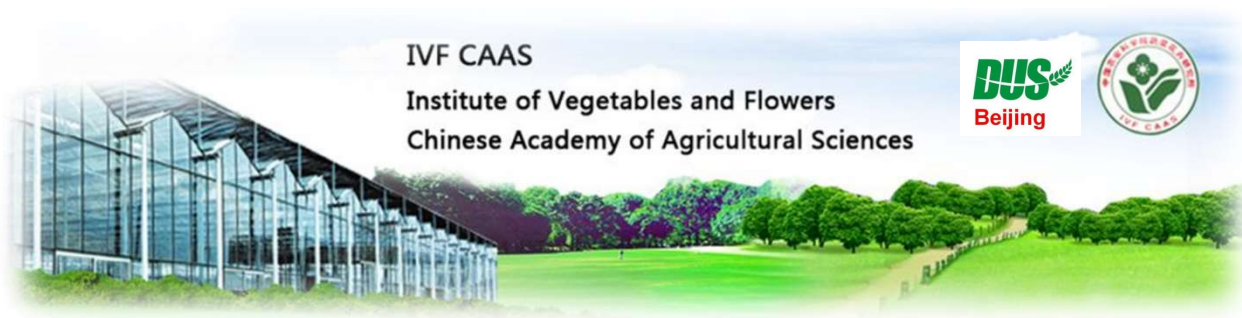


Technical Working Party on Testing Methods and Techniques**TWM/2/11****Second Session****Virtual meeting, April 8 to 11, 2024****Original:** English**Date:** April 2, 2024



A STATISTICAL ANALYSIS SOFTWARE USED FOR DUS TESTING OF PLANT VARIETY (DUSCEL4.0)*Document prepared by an expert from China**Disclaimer: this document does not represent UPOV policies or guidance*

The annex to this document contains a copy of a presentation “A statistical analysis software used for DUS testing of Plant Variety (DUSCEL4.0)”, to be made by an expert from China, at the second session of the Technical Working Party on Testing Methods and Techniques (TWM).

[Annex follows]



IVF CAAS
Institute of Vegetables and Flowers
Chinese Academy of Agricultural Sciences



A STATISTICAL ANALYSIS SOFTWARE USED FOR DUS TESTING OF PLANT VARIETY (DUSCEL4.0)

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Deputy Director of Beijing Sub-center of New Plant Variety Tests, Ministry of Agriculture and Rural Affairs, China
TWM2, Virtual meeting, April 8 to 12, 2024

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1. History
2. Workflow
3. Functions of Statistical Analysis
4. Functions of Image Checking and Analysis

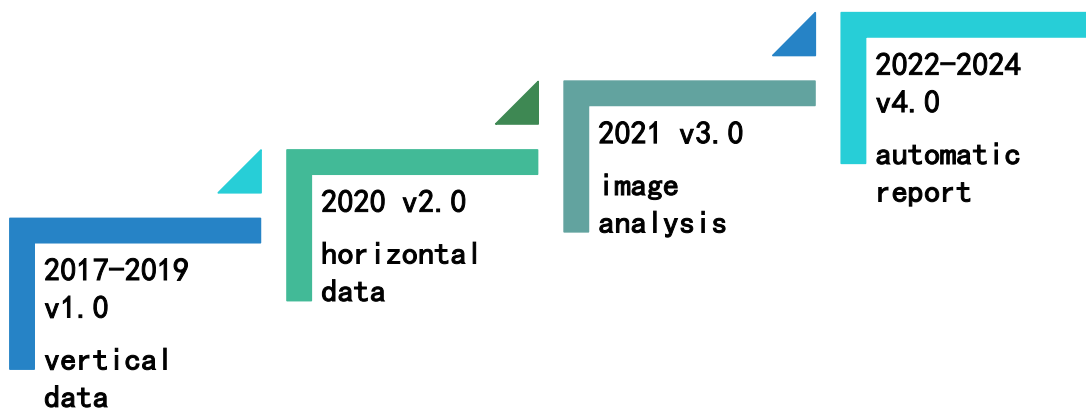
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1. History
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HISTORY OF DUSCEL



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HISTORY OF REPORT

1. 2019, DUSCEL V1.0, 12 sheets and 46 functions, TWC37
2. 2020, DUSCEL V2.0, 6 sheets and 55 functions, TWC38
3. 2021, DUSCEL V2.5, 7 sheets and 52 functions, TWA50
4. 2021, DUSCEL V3.0, 5 sheets and 42 functions, TWC39
5. 2022, DUSCEL V3.5, 8 sheets and 35 functions, TWV56
6. 2022, DUSCEL V3.5, 8 sheets and 35 functions, TWM1
7. 2023, DUSCEL V4.0, 8 sheets and 41 functions, TWA52

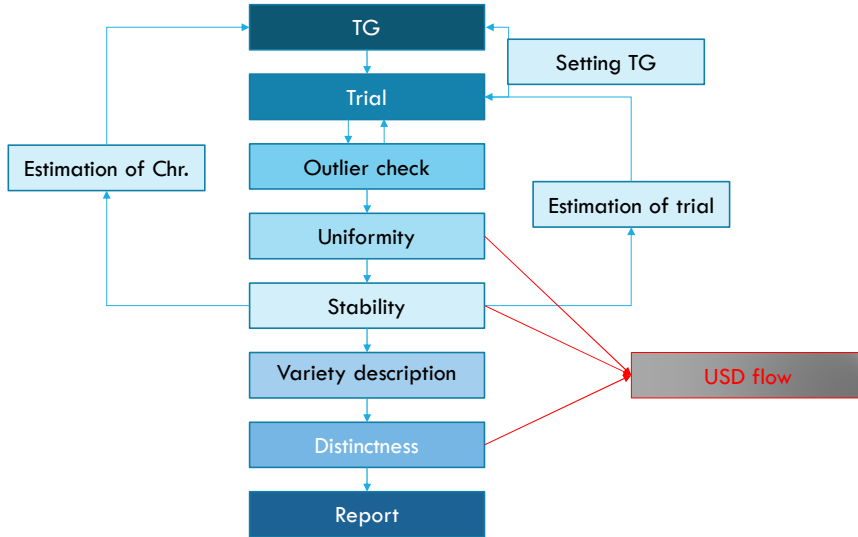
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NEW FLOW : RECYCLING, PRECISE AND EFFICIENT



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NEW FLOW : RECYCLING, PRECISE AND EFFICIENT

The collage displays several key components of the workflow:

- TG:** A data table with columns for Type, Variety, Trial, Replicate, Setting, and other parameters.
- COYD:** A heatmap visualization showing data patterns across different varieties and trials.
- Image:** A grid of photographs showing plant growth stages under different conditions.
- OT, RV, COYU:** A data table with columns for Type, Variety, and other attributes.
- Distinctness:** A data table with columns for Variety, Year, and other metrics, used for variety identification.
- COYS:** A data table with columns for Type, Variety, and other parameters.
- Similar varieties:** A heatmap showing similarity between different varieties.
- Report of DUS Testing:** A final summary report with columns for Variety Name, Latin Name, Testing Conditions, and other details.

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1. History
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3. Functions of Statistical Analysis
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TG

once setting, never change.

DataIndex	NoteIndex	ChrID	MinValue	Note	Description	STVariety	STMean	RLMean
30001	30000	3	0	1	determinate			1
30002	30015	3	1.5	2	indeterminate			2
40001	40000	4	0	1	very short			30
40002	40003.8	4	3.8	2	very short to short			40
40003	40013.8	4	13.8	3	short			50
40004	40023.8	4	23.8	4	short to medium			60
40005	40033.8	4	33.8	5	medium	TMT0467		70
40006	40043.8	4	43.8	6	medium to long			80
40007	40053.8	4	53.8	7	long	TMT0484		90
40008	40063.8	4	63.8	8	long to very long			100
40009	40073.8	4	73.8	9	very long			110
50001	50000	5	0	1	very short			70
50002	50072.35	5	72.35	2	very short to short			80
50003	50082.35	5	82.35	3	short			90
50004	50092.35	5	92.35	4	short to medium			100
50005	50102.35	5	102.35	5	medium	TMT0389		110
50006	50112.35	5	112.35	6	medium to long			120
50007	50122.35	5	122.35	7	long	TMT0405		130
50008	50132.35	5	132.35	8	long to very long			140
50009	50142.35	5	142.35	9	very long			150

Setting Notes

GeneraorSpecies	Tomato
LatinName	<i>Lycopersicon esculentum</i> Mill
TGVersion	NY/T 2236-2012 Guidelines for the conduct of tests for distinctness, uniformity and stability— Tomato
PopulationStandard	0.01
AcceptableProbability	0.95
TGFilePath	E:\DUSCELLPVDB\Tomato\TG
DataFilePath	E:\DUSCELLPVDB\Tomato\Trial
ImageFilePath	E:\DUSCELLPVDB\Tomato\Image
ImageReportPath	E:\DUSCELLPVDB\Tomato\RPImage
VarietyFilePath	E:\DUSCELLPVDB\Tomato\Variety

Setting Test Guidelines

ChrID	ChrName	ExpresType	RecordType	TestPeriod	ValueUnit	ValueType	MinValue	MaxValue	GroupID	Weight	Threshold	ImageID
4	Only varieties with plan QN	MS			cm	AnyValue	6	220			2	
5	Only varieties with plan QN	MS			cm	AnyValue	20	200			2	
6	Plant growth habit	PQ	VG			Integer	1	3			1	

Setting Characteristics

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TRIAL

all data mixed together for uniformity and description

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Type	Variety	Trial	Replicate	Sample	Offtype	1	2	2	2	2	2	2	2	2	2	2	3
237	CND	TMT0232	2020	1	20	2	9	6	6	6	6	6	7	6	7	7	7	2
238	SML	TMT0065	2020	1	20	2	9	6	6	6	6	6	7	6	7	6	5	7
239	CND	TMT0233	2020	1	20	2	9	6	7	7	6	7	7	8	7	6	7	2
240	CND	TMT0234	2020	1	20	1	9	7	7	7	7	6	7	8	7	7	7	2
241	SML	TMT0235	2020	1	20	1	9	7	7	6	7	7	7	7	7	7	7	2
242	CND	TMT0229	2020	1	20	1	9	7	7	7	7	6	6	6	6	7	6	2
243	CND	TMT0231	2020	1	20	1	9	7	7	6	6	6	6	6	7	7	7	2
244	CND	TMT0464	2020	1	20	1	9	6	6	7	6	7	6	8	7	7	7	2
245	CND	TMT0465	2020	1	20	1	9	7	7	7	7	7	7	7	7	7	7	2
246	CND	TMT0466	2020	1	20	1	9	6	6	6	6	6	6	6	6	6	6	2
247	CND	TMT0467	2020	1	20	1	9	5	6	6	6	6	6	5	6	6	5	1
248	CND	TMT0468	2020	1	20	0	9	6	6	7	7	7	7	7	7	7	7	1
249	CND	TMT0469	2020	1	20	0	9	7	7	6	7	7	7	6	7	7	6	1
250	CND	TMT0470	2020	1	20	0	9	7	6	6	6	6	6	6	7	6	6	1
251	CND	TMT0471	2020	1	20	0	9	5	5	6	5	6	6	5	6	6	6	1
252	CND	TMT0472	2020	1	20	0	9	7	6	6	6	6	6	6	6	6	6	1
253	CND	TMT0473	2020	1	20	0	9	5	7	6	5	8	6	6	5	5	6	1

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OUTLIER CHECK

Valid, Boxplot, 3σ

ChrID	ChrName	ExpressType	RecordType	TestPeriod	ValueUnit	ValueType	MinValue	MaxValue
1	*Seedling: anthocyanin	QL	VG			Sequence	1,9	
2	Plant: number of inflore	QN	MS		node	Integer	1	12
3	*Plant: growth type	QL	VG			Integer	1	2
4	Only varieties with plan	QN	MS		cm	AnyValue	6	220

TG

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Type	Variety	Trial	Replicate	Sample	Offtype	1	2	2	2	2	2	2	2	2	2	2	3
237	CND	TMT0232	2020	1	20	2	9	6	6	6	6	6	7	6	7	7	7	2
238	SML	TMT0065	2020	1	20	2	9	6	6	6	6	6	7	6	7	6	5	7
239	CND	TMT0233	2020	1	20	2	9	6	7	7	6	7	7	8	7	6	7	2
240	CND	TMT0234	2020	1	20	1	9	7	7	7	7	6	7	8	7	7	7	2
241	SML	TMT0235	2020	1	20	1	9	7	7	6	7	7	7	7	7	7	7	2
242	CND	TMT0229	2020	1	20	1	9	7	7	7	7	6	6	6	6	7	6	2
243	CND	TMT0231	2020	1	20	1	9	7	7	6	6	6	6	6	7	7	7	2
244	CND	TMT0464	2020	1	20	1	9	6	6	7	6	7	6	8	7	7	7	2
245	CND	TMT0465	2020	1	20	1	9	7	7	7	7	7	7	7	7	7	7	2
246	CND	TMT0466	2020	1	20	1	9	6	6	6	6	6	6	6	6	6	6	2
247	CND	TMT0467	2020	1	20	1	9	5	6	6	6	6	6	5	6	6	5	1
248	CND	TMT0468	2020	1	20	0	9	6	6	7	7	7	7	7	7	7	7	1
249	CND	TMT0469	2020	1	20	0	9	7	7	6	7	7	7	6	7	7	6	1
250	CND	TMT0470	2020	1	20	0	9	7	6	6	6	6	6	6	7	6	6	1
251	CND	TMT0471	2020	1	20	0	9	5	5	6	5	6	6	5	6	6	6	1
252	CND	TMT0472	2020	1	20	0	9	7	6	6	6	6	6	6	6	6	6	1
253	CND	TMT0473	2020	1	20	0	9	5	7	6	5	8	6	6	5	5	6	1

Trial

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UNIFORMITY OT, VR, COYU

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Type	Variety	Trial	Replicate	Sample	Offtype												
237	CND	TMT0232	2020	1	20	2	9	6	6	6	6	6	6	7	6	7	7	2
238	SML	TMT0465	2020	1	20	2	9	6	6	6	6	6	7	7	6	5	7	2
239	CND	TMT0233	2020	1	20	2	9	6	6	6	6	7	8	7	6	7	2	
240	CND	TMT0234	2020	1	20	1	9	7	7	7	7	7	7	7	7	7	2	
241	SML	TMT0235	2020	1	20	1	9	7	7	7	7	7	7	7	7	7	2	
242	CND	TMT0229	2020	1	20	1	9	7	7	7	7	6	6	6	6	6	2	
243	CND	TMT0231	2020	1	20	1	9	7	7	6	6	6	6	6	6	7	2	
244	CND	TMT0464	2020	1	20	1	9	6	6	7	6	7	6	8	7	7	2	
245	CND	TMT0466	2020	1	20	1	9	7	7	7	7	7	7	7	7	7	2	
246	CND	TMT0468	2020	1	20	1	9	6	6	6	6	6	6	6	6	6	2	
247	CND	TMT0467	2020	1	20	1	9	6	6	6	6	6	6	6	6	6	2	
248	CND	TMT0469	2020	1	20	0	9	6	6	6	6	6	6	6	6	6	2	
250	CND	TMT0470	2020	1	20	0	9	6	6	6	6	6	6	6	6	6	2	
251	CND	TMT0471	2020	1	20	0	9	6	6	6	6	6	6	6	6	6	2	
252	CND	TMT0472	2020	1	20	0	9	6	6	6	6	6	6	6	6	6	2	
253	CND	TMT0473	2020	1	20	0	9	5	7	6	6	6	6	6	6	6	2	

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Type	Variety	Trial	Replicate	Sample	Offtype												
237	CND	TMT0477	2															
238	CND	TMT0478	2															
239	CND	TMT0479	1															
240	CND	TMT0480	1															
241	CND	TMT0481	2															
242	CND	TMT0482	2															
243	CND	TMT0483	2															
244	CND	TMT0484	1															
245	CND	TMT0485	1															
246	CND	TMT0486	2															
247	CND	TMT0487	2															
248	CND	TMT0488	2															
249	CND	TMT0489	2															
250	CND	TMT0490	2															
251	CND	TMT0491	2															
252	CND	TMT0492	2															
253	CND	TMT0493	2															

Off-type

relative variance

COYU

Results

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Type	Variety	Trial	Replicate	Sample	Offtype												
237	CND	TMT0477	2															
238	CND	TMT0478	2															
239	CND	TMT0479	1															
240	CND	TMT0480	1															
241	CND	TMT0481	2															
242	CND	TMT0482	2															
243	CND	TMT0483	2															
244	CND	TMT0484	1															
245	CND	TMT0485	1															
246	CND	TMT0486	2															
247	CND	TMT0487	2															
248	CND	TMT0488	2															
249	CND	TMT0489	2															
250	CND	TMT0490	2															
251	CND	TMT0491	2															
252	CND	TMT0492	2															
253	CND	TMT0493	2															

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SETTING TG DatatoMS, QnFrDis, COYS, Calib, Renew

#	A	B	C	D	E	F	G	H	I	J	K	L
1	Type	Variety	Trial	Replicate	Sample	Offtype						
3	CND	TMT0174	7	6	6	6	6	6	7	6	7	7
4	CND	TMT0176	8	7	6	6	6	6	6	6	5	7
5	CND	TMT0177	8	7	7	7	6	8	6	8	8	7
6	CND	TMT0171	7	7	8	7	8	7	7	7	8	7
7	CND	TMT0178	7	7	7	7	8	7	7	7	7	6
8	CND	TMT0180	6	6	6	6	6	6	6	6	6	6
9	CND	TMT0111	7	7	6	7	6	7	6	7	6	6
10	CND	TMT0181	7	6	7	7	7	7	7	7	7	6
11	CND	TMT0183	8	7	6	7	6	6	8	7	7	7
12	CND	TMT0110	7	7	7	6	5	6	7	6	6	7
13	CND	TMT0184	7	6	7	7	6	6	6	7	6	7
14	CND	TMT0185	6	5	5	6	6	6	6	7	6	6
15	CND	TMT0182	7	7	7	6	7	6	6	7	7	6
16	CND	TMT0189	7	6	7	6	6	6	7	7	7	6
17	CND	TMT0190	6	7	6	6	6	5	7	5	6	6
18	CND	TMT0191	6	6	6	6	6	6	7	6	5	5
19	CND	TMT0192	6	7	8	7	6	7	6	7	5	6
20	CND	TMT0194	7	7	7	6	7	6	7	6	6	6

DatatoMS

QnFrDis

Setting standard varieties

Character	220201	420201	520201	820201	902021	220201	230201	240201
Total Mean	674296	881921	1191907	421026	382882	695993	111722	122222
Total Sum	18880	35665	290176	117890	107267	239022	312649	266501
Total Var	0.548979	174.389	79.5284	15.8099	27.67	0.05039	4749.91	0.0719
Total SMD	129444	304838	316477	500762	4182313	2419.86	4.8E+07	3132.77
LS2005	0.35678	1.54485	2.65558	1.84717	2.68824	0.08025	10.5575	0.08255
Min	53	67	68	336	67	0.884	11811	17572
Max	82	117	144.6	50.6	45.5	1.442	294036	2.99066
220201 Mid								
1								
2								
3	5.31574	4.95896	3	0.0057				
4	6.0295	5.67932	61	0.11897				
5	6.74296	6.28656	138	0.28236				
6	7.45642	7.09961	73	0.18978				
7	8.16987	7.81319	6	0.09591				
420201 Mid								
1	76.2323	74.6884	3	0.005				
2	79.3223	77.7781	2	0.0038				
3	82.4127	80.8678	2	0.0038				
4	85.5024	83.9573	4	0.0076				
5	88.5921	87.0473	7	0.01331				
6	91.6818	90.137	3	0.0057				
7	94.7715	92.2267	4	0.0076				
8	97.8612	96.3164	2	0.0038				

DateIndex	IndexIndex	ChrID	Min/Value	Note	Description	STVariety	STMean
10001	10000	1	0	1	absent		1
10009	10005	1	5	9	present		9
20001	20000	2	0	1	few		2
20002	20002	2	2.5	2	few to medium	TMT0415	4
20003	20004.5	2	4.5	3	medium		6
20004	20006.5	2	6.5	4	medium to many		8
20005	20008.5	2	8.5	5	many		10
30001	30000	3	0	1	determinate		1
30002	30001.5	3	1.5	2	intermediate		2
40001	40000	4	0	1	very short		30
40002	40003.8	4	3.8	2	very short to short		40
40003	40011.8	4	11.8	3	short		50
40004	40023.8	4	23.8	4	short to medium		60
40005	40033.8	4	33.8	5	medium	TMT0467	70
40006	40043.8	4	43.8	6	medium to long		80
40007	40053.8	4	53.8	7	long	TMT0484	90
40008	40063.8	4	63.8	8	long to very long		100
40009	40073.8	4	73.8	9	very long		110

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SETTING TG

DatatoMS, QnFrDis, COYS, Calib, Renew

DataIndex	NoteIndex	ChrID	MinValue	Note	Description	STVariety	STMean	RLMean
10001	10000	1	0	1	absent			1
10009	10005	1	5	9	present			9
20001	20000	2	0	1	few			2
20002	20003	2	3	2	few to medium			4
20003	20005	2	5	3	medium	TMT0415	6	6
20004	20007	2	7	4	medium to many			8
20005	20009	2	9	5	many			10
30001	30000	3	0	1	determinate			1
30002	30001.5	3	1.5	2	indeterminate			2
40001	40000	4	0	1	very short			30
40002	40035.9	4	35.9	2	very short to short			40
40003	40045.9	4	45.9	3	short			50
40004	40055.9	4	55.9	4	short to medium			60
40005	40065.9	4	65.9	5	medium	TMT0467	70	70.9
40006	40075.9	4	75.9	6	medium to long			80
40007	40085.9	4	85.9	7	long	TMT0484	90	90
40008	40095.9	4	95.9	8	long to very long			100
40009	40105.9	4	105.9	9	very long			110

Calib

DataIndex	NoteIndex	ChrID	MinValue	Note	Description	STVariety	STMean	RLMean
10001	10000	1	0	1	absent			1
10009	10005	1	5	9	present			9
20001	20000	2	0	1	few			2
20002	20002.5	2	2.5	2	few to medium			4
20003	20004.5	2	4.5	3	medium	TMT0415	6	5.5
20004	20006.5	2	6.5	4	medium to many			8
20005	20008.5	2	8.5	5	many			10
30001	30000	3	0	1	determinate			1
30002	30001.5	3	1.5	2	indeterminate			2
40001	40000	4	0	1	very short			30
40002	39972.6	4	-27.4	2	very short to short			40
40003	39982.6	4	-17.4	3	short			50
40004	39992.6	4	-7.4	4	short to medium			60
40005	40002.6	4	2.6	5	medium	TMT0467	70	41.0
40006	40012.6	4	12.6	6	medium to long			80
40007	40022.6	4	22.6	7	long	TMT0484	90	55.0
40008	40032.6	4	32.6	8	long to very long			100
40009	40042.6	4	42.6	9	very long			110

Renew

15

STABILITY

COYS

show the difference of notes between trials

Type	Variety	M2020	M2021	N2020	N2021	V2020	V2021	M2020	N2020	V2020	M2021	N2021	V2021			
113	CND	TMT0386						9	9	9	7.1	6.2	4	3	4	2
114	CND	TMT0387						9	9	9	7	6.2	4	3	4	2
115	CND	TMT0388						9	9	9	7	6	4	3	4	2
116	CND	TMT0389						9	9	9	7.1	5.8	4	3	4	2
117	CND	TMT0390						9	9	9	7.1	5.8	4	3	4	2
118	CND	TMT0391						9	9	9	7.3	6.2	4	3	4	2
119	CND	TMT0392						9	9	9	7.3	7	4	4	4	2
120	CND	TMT0393						9	9	9	6.8	6	3	3	3	2
121	CND	TMT0394						9	9	9	6.9	5.6	3	3	3	2
122	CND	TMT0395						9	9	9	7.6	6.2	4	3	4	2
123	CND	TMT0396						9	9	9	7.6	6.9	4	4	4	2
124	CND	TMT0397						9	9	9	6.9	6.1	3	3	3	2
125	CND	TMT0398						9	9	9	7.1	6.1	4	3	4	2
126	CND	TMT0399						9	9	9	7.3	6.5	4	4	4	2
127	CND	TMT0400						9	9	9	6.5	5.6	3	3	3	2
128	CND	TMT0401						9	9	9	7.3	5.9	4	3	4	2
129	CND	TMT0402						9	9	9	6.9	5.6	3	3	3	2
130	CND	TMT0403						9	9	9	6.7	5.8	3	3	3	2
131	CND	TMT0404						9	9	9	7.5	6.4	4	3	4	2

Type	Variety	Number of trials	Average of CC	Note2020,2021
CND	TMT0386	2	0.871794301	0.871794301
CND	TMT0387	2	0.904489185	0.904489185
CND	TMT0388	2	0.893017999	0.893017999
CND	TMT0389	2	0.898921739	0.898921739
CND	TMT0390	2	0.882314125	0.882314125
CND	TMT0391	2	0.880557136	0.880557136
CND	TMT0392	2	0.891028945	0.891028945
CND	TMT0393	2	0.907504762	0.907504762
CND	TMT0394	2	0.829305256	0.829305256
CND	TMT0395	2	0.904509455	0.904509455
CND	TMT0396	2	0.908830548	0.908830548
CND	TMT0397	2	0.897742715	0.897742715
CND	TMT0398	2	0.904697492	0.904697492
CND	TMT0399	2	0.810889443	0.810889443
CND	TMT0400	2	0.860706977	0.860706977
CND	TMT0401	2	0.885653388	0.885653388
CND	TMT0402	2	0.850536396	0.850536396
CND	TMT0403	2	0.866103259	0.866103259
CND	TMT0404	2	0.907574678	0.907574678
CND	TMT0405	2	0.848091002	0.848091002
CND	TMT0406	2	0.865269532	0.865269532
CND	TMT0407	2	0.829599932	0.829599932
CND	TMT0408	2	0.88426351	0.88426351
CND	TMT0409	1		

show correlation coefficient of varieties between years

Type	Chr.	Mean CC	Note CC	M2020,2021	N2020,2021	V2020,2021
VG	1	-Seedling anthocyanin coloration of hypocotyl				80
MS	2	Plant number	0.677786078	0.677786078	0.677786078	80
VG	3	Plant growth type	0.940774931	0.940774931	0.940774931	80
MS	4	Only var.	0.430703818	0.430703818	0.430703818	22
MS	5	Only var.	0.168200137	0.090002638	0.168200137	56
VG	6	Plant growth habit	-0.031659422	-0.031659422	-0.031659422	80
VG	7	Leaf attitude	0.168958931	0.168958931	0.168958931	80
MS	8	Leaf: le	0.647925309	0.629925386	0.647925309	80
MS	9	Leaf: w	0.430947123	0.538484613	0.430947123	80
VG	10	Leaf: type				80
VG	11	Leaf: size of leaflets	0.096813436	0.096813436	0.096813436	80
VG	12	Leaf: intensity of green co	0.414503597	0.414503597	0.414503597	80
VG	13	Leaf attitude of petiole of	0.043316108	0.043316108	0.043316108	80
VG	14	Inflorescence type	0.158009911	0.158009911	0.158009911	80
VG	15	Flower: cluster				80
VG	16	Flower: color	0.245613821	0.245613821	0.245613821	80
VG	17	Fruit: green shoulder (befc	0.973113355	0.973113355	0.973113355	80
VG	18	Fruit: extent of green shou	0.393663181	0.393663181	0.393663181	28
VG	19	Fruit: intensity of green co	0.474488331	0.474488331	0.474488331	28
VG	20	Fruit: intensity of green co	0.609173661	0.609173661	0.609173661	80
VG	21	Peduncle: abscission layer	0.443115437	0.443115437	0.443115437	80
MS	22	Only var.	0.290023068	0.290023068	0.290023068	59
MS	23	Fruit: w	0.94324573	0.918133921	0.94324573	80
MS	24	Fruit: re	0.901384277	0.865997374	0.901384277	80

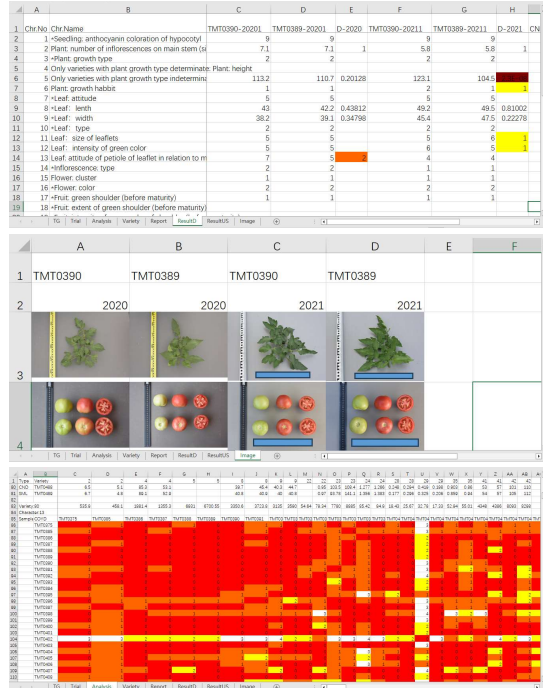
show correlation coefficient of characteristics between years

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DISTINCTNESS Report, COYD

Report of DUS Testing			
Variety Name	TMT0390		
Latin Name	Lycopersicon esculentum Mill		
Testing Guidelines	NV17 Z238-2012 Guidelines for the conduct of tests for distinctness, uniformity and stability—Tomato		
Trials	2020;2021;		
Similar Varieties	D0.91:TMT0020.D0.9:TMT0103.D0.9:TMT0102.D0.9:TMT0145.D0.9:TMT0099.D0.91:TMT0090.D0.92:TMT0942.D0.92:TMT0220.D0.94:TMT0046.D0.91:TMT0050.D0.93:TMT0131.D0.9:TMT0054.D0.92:TMT0101.D0.92:TMT0110.D0.91:TMT0111.D0.94:TMT0162.D0.92:TMT0163.D0.92:TMT0171.D0.93:TMT0176.D0.91:TMT0173.D0.91:TMT0212.D0.91:TMT0214.D0.91:TMT0215.D0.91:TMT0217.D0.94:TMT0218.D0.92:TMT0226.D0.95:TMT0281		
Distinctness	distinct from TMT0389		
Uniformity	uniform		
Stability	stable		

Variety Description			
Characteristics	Note	State of Expression	Reference
1-Seedling: anthocyanin coloration of hypocotyl		9 present	
2-Plant: number of inflorescences on main stem (side shoots to be removed)		3 medium	6.4Node
3-Plant: growth type		2 indeterminate	
4-Only varieties with plant growth type determinate: Plant: height			
5-Only varieties with plant growth type indeterminate: Plant: height		6 medium to long	118.15cm



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CONTENTS

1. History
2. Workflow
3. Functions of Statistical Analysis
4. Functions of Image Checking and Analysis

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IMAGE STORAGE AND PROCESSING

RenFiles, TextImages

工作 (E:) > DUSCEL > PVDB > Tomato > Image > 2020 > TMT0400

1.JPG 2.JPG

Old name	File type	File address	New name
1.JPG	File	E:\DUSCEL\PVDB\Tomato\Image\2020\TMT0400	TMT0400-1.JPG
2.JPG	File	E:\DUSCEL\PVDB\Tomato\Image\2020\TMT0400	TMT0400-2.JPG

工作 (E:) > DUSCEL > PVDB > Tomato > Image > 2020 > TMT0400

TMT0400-1.JPG TMT0400-2.JPG

工作 (E:) > DUSCEL > PVDB > Tomato > ImageRP > TMT0400

1.jpg 2.jpg

21

IMAGE CHECKING

Inslmage, ShowImage, ListImages, Comlmages

1	A	B	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	
126	CND	TMT0399	0.91413	0.87051	4	4	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
127	CND	TMT0400	0.85986	0.83575	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
128	CND	TMT0401	0.8586	0.87349	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
129	CND	TMT0402	0.79751	0.8221	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
130	CND	TMT0403	0.97778	0.78735	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
131	CND	TMT0404	0.88031	0.82716	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
132	CND	TMT0405	0.80708	0.77375	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
133	CND	TMT0406	0.86858	0.87329	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
134	CND	TMT0407	0.8185	0.82128	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
135	CND	TMT0408	0.86395	0.84511	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
136	CND	TMT0409	0.86917	0.86917	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
137	CND	TMT0410	0.91148	0.82453	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
138	CND	TMT0411	0.8676	0.85846	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
139	CND	TMT0412	0.85751	0.88867	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
140	CND	TMT0413	0.75915	0.80392	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
141	CND	TMT0414	0.82078	0.80751	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
142	CND	TMT0415	1.2684	0.77762	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
143	CND	TMT0416	0.89064	0.82412	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
144	CND	TMT0289	0.82412	0.82412	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
145	CND	TMT0290	0.82453	0.82453	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
146	CND	TMT0291	0.86003	0.86003	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
147	CND	TMT0292	0.88991	0.88991	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
148	CND	TMT0293	0.9164	0.9164	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
149	CND	TMT0294	0.8916	0.8916	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
150	CND	TMT0295	0.88641	0.88641	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020
151	CND	TMT0296	0.87979	0.87979	4	3	4	24	25M2020	25M2021	25N2020	25N2021	25	26M2020	26M2021	26N2020	26N2021	26	27M2020	27M2021	27N2020

ImageComparison

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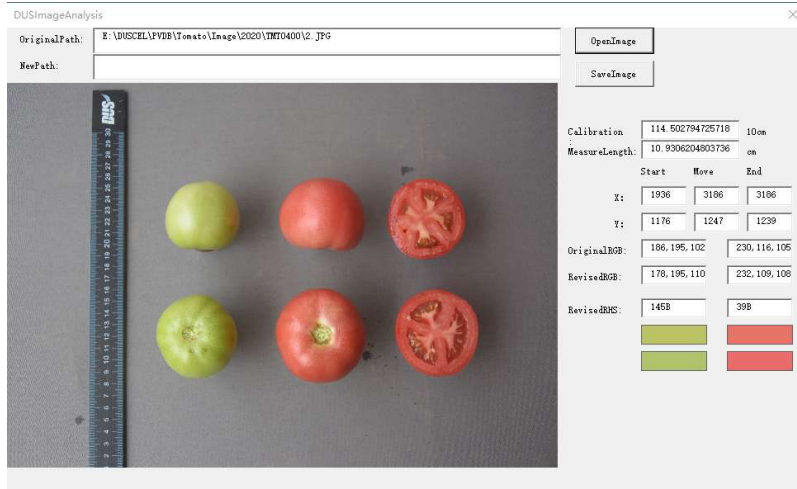
File Path: E:\DUSCEL\PVDB\Tomato\Image\2021\ TMT0399

25 *Fruit: shape in longitudinal section

- 1 flattened
- 2 oblate
- 3 circular
- 4 oblong
- 5 cylindric
- 6 elliptic
- 7 cordate
- 8 obovate
- 9 ovate
- 10 pyriform

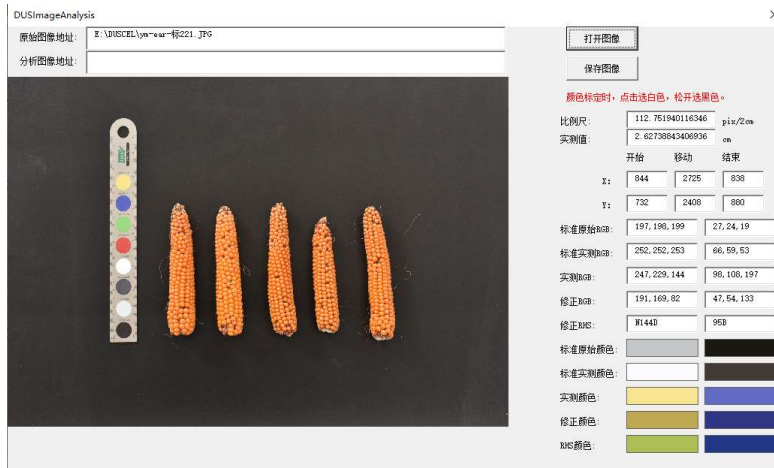
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IMAGE ANALYSIS AnalImage



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IMAGE ANALYSIS AnalImage (new version in DUSCEL4.0CN)



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IVF CAAS
Institute of Vegetables and Flowers
Chinese Academy of Agricultural Sciences



**THANK YOU FOR YOUR
ATTENTION!**

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