UPOV
International Union for the Protection of New Varieties of Plants

E

Technical Working Party for Agricultural Crops

TWA/50/8

Fiftieth Session
Arusha, United Republic of Tanzania, June 21 to 25, 2021

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EXCHANGEABLE SOFTWARE

Document prepared by an expert from China

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The annex to this document contains a copy of a presentation “A Statistical Analysis Software：DUSCEL3.0”, to be made by an expert from China, at the fiftieth session of the Technical Working Party for Agricultural Crops (TWA).

[Annex follows]

A STATISTICAL ANALYSIS SOFTWARE : DUSCEL3.0

Yang Kun, China

50th session of TWA, Arusha, United Republic of Tanzania

June 21 to June 25, 2021

CONTENTS

- Background
- Objectives
- Main functions
- Applications in Maize
- Discussion
- Future plans

BACKGROUND

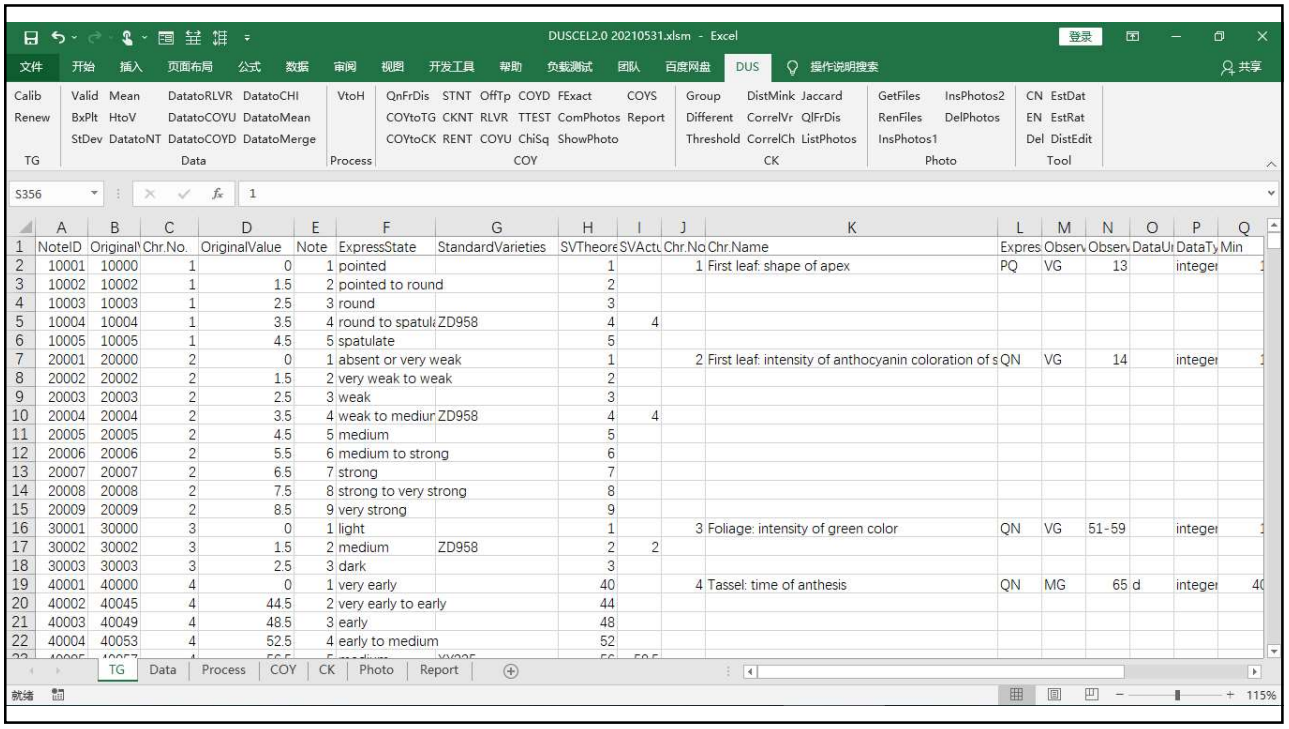
1. 2017-2019, EXCEL+VBA+UI, Kun Yang from Beijing Sub-center of New Plant Variety Tests, MARA, P.R.China
2. 2019, V1.0, 12 sheets and 46 functions, reported in TWC 37.
3. 2020, V2.0, 6 sheets and , reported in TWC 38.
4. 2021, V3.0, 7 sheets and , reported in TWA 50.
5. 2021, V3.0, 7 sheets and , reported in TWC 39.

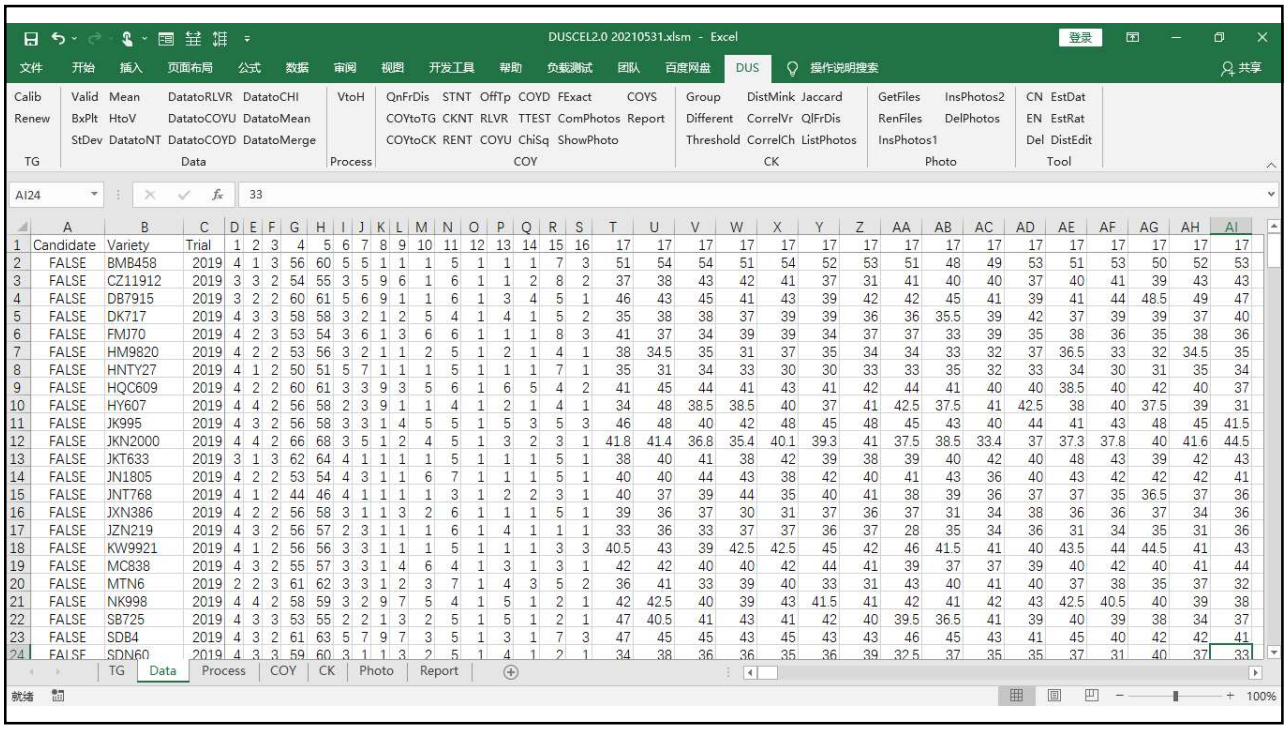
OBJECTIVES

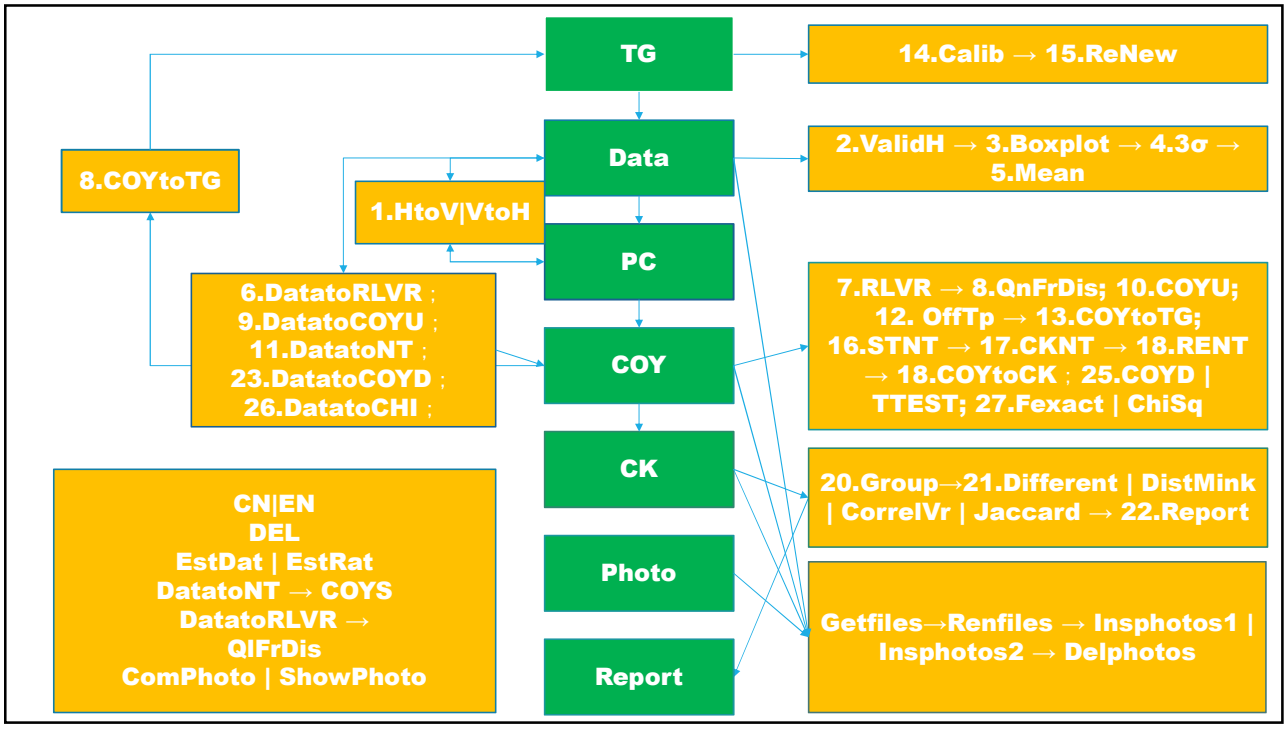
1. Create a simple software to manage data and photos of DUS trials.
2. Create an efficient analytical procedure for DUS based on one TG table and data table.
3. Create a closed-loop, consistent with statistical and genetic theory, constant result of the DUS analysis judgment solution.

MAIN FUNCTIONS

- Checking abnormal data by data definition, boxplot and 3σ methods.
- Produce note from original data by interval and regression methods.
- A whole solution for analysis of distinctness by note level, data level and photo level.
- A whole solution for analysis of uniformity by off-type, relative variance, COYU.
- A whole solution for analysis of stability by COYS from variety side and characteristics side.
- Methods for Batch Checking and Renaming of photo files.
- Methods for verification of Characteristics and trial.




DUSCEL2.0 20210531.xlsm - Excel
TG
Data
Process
COY
CK
Photo
Tool
Candidate Variety Trial
FALSE BMB458 2019
FALSE CZ11912 2019
FALSE DB7915 2019
FALSE DK717 2019
FALSE FMJ70 2019
FALSE HM9820 2019
FALSE HNTY27 2019
FALSE HQC609 2019
FALSE HY607 2019
FALSE JK995 2019
FALSE JKN2000 2019
FALSE JKT633 2019
FALSE JN1805 2019
FALSE JNT768 2019
FALSE JXN386 2019
FALSE JZN219 2019
FALSE KW9921 2019
FALSE MC838 2019
FALSE MTN6 2019
FALSE NK998 2019
FALSE SB725 2019
FALSE SDB4 2019
FALSE SDN60 2019
TG
Data
Process
COY
CK
Photo
Report


TG
14.Calib → 15.ReNew
Data
2.ValidH → 3.Boxplot → 4.3σ → 5.Mean
8.COYtoTG
1.HtoV|VtoH
PC
6.DatatoRLVR ;
9.DatatoCOYU ;
11.DatatoNT ;
23.DatatoCOYD ;
26.DatatoCHI ;
7.RLVR → 8.QnFrDis; 10.COYU;
12. OffTp → 13.COYtoTG;
16.STNT → 17.CKNT → 18.RENT
→ 18.COYtoCK ; 25.COYD |
TTEST; 27.Fexact | ChiSq
COY
CK
20.Group→21.Different | DistMink
| CorrelVr | Jaccard → 22.Report
CN|EN
DEL
EstDat | EstRat
DatatoNT → COYS
DatatoRLVR →
QlFrDis
ComPhoto | ShowPhoto
Photo
Getfiles→Renfiles → Insphotos1 |
Insphotos2 → Delphotos
Report

SETTING UP PARAMETERS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	NoteID	LookupValueID	Chr.No.	LookupValue	Note	ExpressState	Standard Varieties	SVTheoreticalMean	SVActual Mean	Chr. No.	Chr.Name	ExpressionType	ObservationType	ObservationTime	DataUnit	DataType	Min	Max	Group	Power	SignificantDistance	photo	PopulationStandard	AcceptanceProbability
2	10001	10000	1	0	1	卵圆形		1		1	子叶：形状	PQ	VG			整数	1	2			1			
3	10002	10001.5	1	1.5	2	椭圆形		2																
4	20001	20000	2	0	1	凹		1		2	*子叶：横切	PQ	VG			整数	1	3			1			
5	20002	20001.5	2	1.5	2	平		2																
6	20003	20002.5	2	2.5	3	凸		3																
7	30001	30000	3	0	1	无		1		3	*雌花：花冠	QL	VG			序列	1, 9		1		0			
8	30009	30005	3	5	9	有		9																
9	40001	40000	4	0	1	黄色		1		4	雌花：花冠	PQ	VG			整数	1	3			0			
10	40002	40001.5	4	1.5	2	绿色		2																
11	40003	40002.5	4	2.5	3	黄绿相间		3																
12	50001	50000	5	0	1	极弱		1		5	仅用于花冠	QN	VG			整数	1	9			2			
13	50002	50001.5	5	1.5	2	极弱到弱		2																
14	50003	50002.5	5	2.5	3	弱		3																
15	50004	50003.5	5	3.5	4	弱到中		4																
16	50005	50004.5	5	4.5	5	中		5																
17	50006	50005.5	5	5.5	6	中到强		6																
18	50007	50006.5	5	6.5	7	强		7																
19	50008	50007.5	5	7.5	8	强到极强		8																
20	50009	50008.5	5	8.5	9	极强		9																
21	60001	60000	6	0	1	无		1		6	雄花：花冠	QL	VG			序列	1, 9		2		0			
22	60009	60005	6	5	9	有		9																
23	70001	70000	7	0	1	黄色		1		7	*雄花：花冠	PQ	VG			整数	1	3			0			
24	70002	70001.5	7	1.5	2	绿色		2																
25	70003	70002.5	7	2.5	3	黄绿相间		3																

TG | Data | Process | COY | CK | Photo

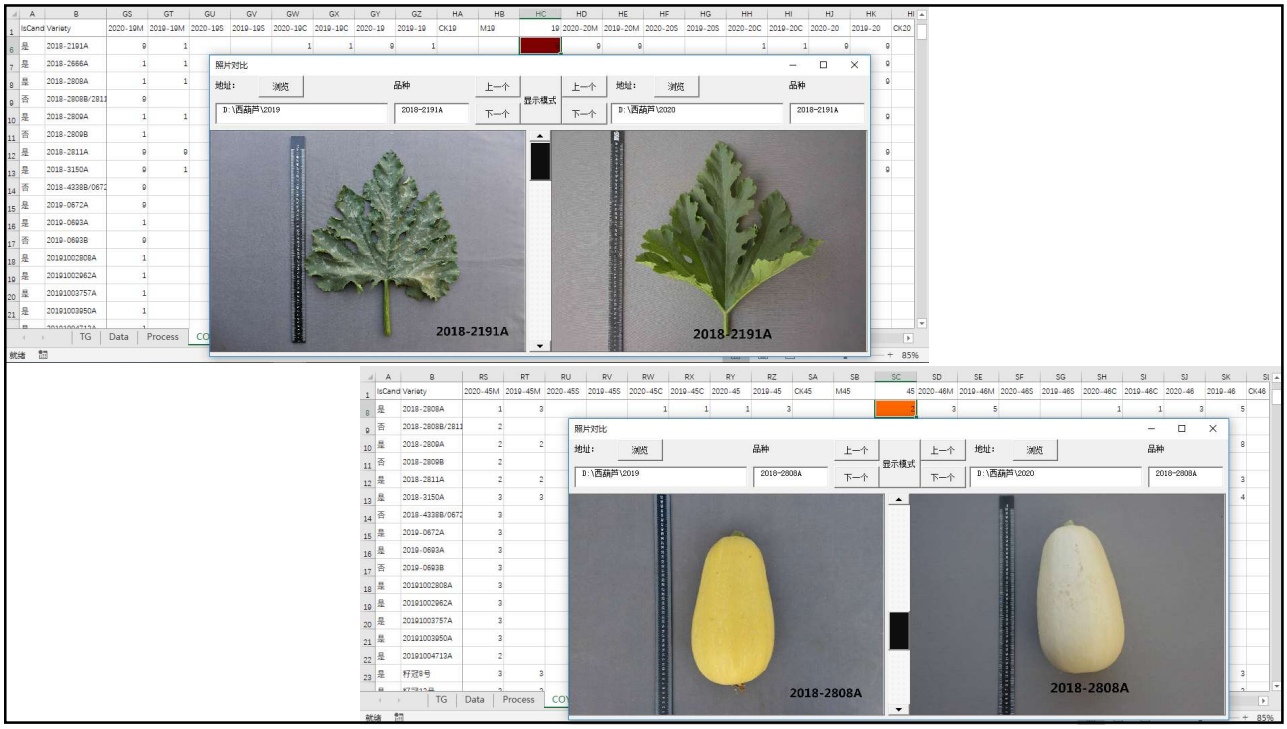
WHOLE SOLUTION FOR CHECKING ABNORMAL DATA

VALID | BXPLT | STDEV

	A	B	C	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC
1	IsCar	Variety	Trial	39	39	39	39	39	39	40	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43
2	是	2018-0432A	2020	7.8	8.1	8.6	9.8	7.5	9.8	1	9	43	40	43	40	41	39	44	38	41	43	39	40.5	41	40.5	41	38	41	41.5	41	38	15	14	15	13	14
3	是	2018-0777A	2020	3.5	4	3.3	3.2	3.5	3.7	4	9	39	37.5	39	38.5	38	39	38	36	40	39	36	38.5	37	38	37.5	38.5	37	37	39	37	15.5	13.5	16	15	14.5
4	是	2018-0798A	2020	4.8	5.2	5.2	5	4.5	6	4	9	37	39	40	37	40	40.5	41.5	41.5	42	41	37	38.5	39	40	38.5	40	41.5	41	39.5	41	14.5	14.5	15.5	15.5	14.5
5	是	2018-2190A	2020	8	4.6	6	7	3.5	6.5	4	9	40	40.5	38	38	40	38	40.5	39	43	38.5	38.5	36.5	41	38	41	41	39.5	38	38	39.5	14.5	13	12	12.5	14
6	是	2018-2191A	2020	6.1	4.7	2.6	5.5	4	3.2	4	9	38	40	38.5	41	40.5	39	38	40	39	36.5	38	38	37.5	38	40	40	37.5	41.5	39.5	38	13	13	13.5	12.5	13
7	是	2018-2666A	2020	5.2	4.8	4	4	7.5	5.6	4	9	41	40.5	40.5	43	40	38	39	52	47	43.5	44	37	41	45.5	40.5	44.5	38.5	41.5	41	39.5	13	13.5	13	13	12.5
8	是	2018-2808A	2020	3	6	2.8	4	4.6	6	4	7	27.5	29.5	29.5	29.5	30	32	30	31	30.5	30.5	26	28	29	29.5	30.5	31.5	29.5	28.5	30.5	33	17	18.5	18.5	18.5	18
9	否	2018-2808B/28	2020	6.5	6.5	5.5	5.5	5	6	4	7	34	30	29	30	30.5	30.5	32	35	32	34	31	36	30	32	31	32	34	34	30	31	14.8	13	13	14	12
10	是	2018-2809A	2020	3.8	4.5	5	3	4.4	4.2	4	9	38.5	37	34	36.5	37	38	38.5	39	38	34.5	38.5	36	37.5	38	36.5	37	36	35.5	38	36	11	10.5	10	12.5	12
11	否	2018-2809B	2020	9.1	9	7	6	5.5	6.6	4	6	21	21	19.5	20.5	20.5	20	21	21	20.5	20	23	22	20.5	19.5	21	22	23	21	21	21.5	12.5	13.5	11	13.5	15
12	是	2018-2811A	2020	3.4	4	3.6	3	3.8	3	1	12	36	35	34.5	35	36	32.5	33	34.5	35	36.5	36.5	34	33.5	31	33	36	36.5	34	36	34.5	12.5	11.5	13	12	12.5
13	是	2018-3150A	2020	4.6	4.4	6	4.4	4.5	5.7	4	9	37	37.5	36.5	36	39	38	35	39	40	38	36	40	33	35	35	37.5	37	38.5	38.5	39	13	13	13.5	14	14
14	否	2018-4338B/06	2020	4.5	5.5	6	5.8	6	4.7	4	8	37	33	30	34	37	35.5	32.5	33	38	38.5	36	36.5	32.5	36	38	38	37	35.5	32	35	14	13	13.5	13	12.5
15	是	2019-0672A	2020	9.2	8	8	9.5	10.5	9.8	4	6	24	23.5	22	22.5	24	22	23	23	21.5	23	24.5	21	21.5	22.5	20	21	22	21.5	22	22.5	18.5	18	17	18.5	18.5
16	是	2019-0693A	2020	3.8	4	6.2	11	8	7.5	4	9	41	40.5	35.5	39.5	41.5	40.5	38	38.5	39	39	40	38.5	41	39.5	39	42.5	42	40.5	39.5	40	15	12	12.5	13	14
17	否	2019-0693B	2020	5.4	4	6	4.9	8.5	6.4	4	9	38	39.5	35	41	39.5	38	37.5	39	40.5	39	37	40.5	39.5	38	39.5	37.5	34.5	40.5	34	34	15	15	14.5	14	15
18	是	20191002808A	2020	10.3	6.5	10.7	9.5	10.5	11	4	9	38.5	36	38	39.5	36	38.5	39	39.5	35	38	39	39	38.5	40	39	40	40.5	37	38	38	14	13	14	14	14.5
19	是	20191002962A	2020	5.5	7.5	9	7	9	8.3	1	4	27	22	25	24	23	23	21	25.5	22	25.7	20	23.5	24.8	22.5	21.5	23	22.5	21	23	23.5	21.5	21	23	20.5	21.5
20	是	20191003757A	2020	8.5	9.5	12.5	9.7	6.8	9.6	1	6	25	29	26.5	24.5	25.5	25	26	24.5	24.5	25	24	24	24	25	23.5	23	22.5	24	23	23	17	19	19	17.5	16
21	是	20191003950A	2020	10.5	10.8	10.3	10.7	13	14	4	9	36	33	39.5	34.5	38	36.5	38	37	33	36	35.5	35	34	38.5	37	39.5	36	35	35	33	11	11	11	11.5	10.5
22	是	20191004713A	2020	5.3	6.5	6.5	4.6	6	5.4	4	9	37.5	33	34	34.5	36.5	37	40.5	41	41	38	38	37.5	34.5	37	39.5	36	37.5	38	36	36.5	11.5	11	11	10.5	12.5

WHOLE SOLUTION FOR GENERATING NOTES

1. DatatoNt: calculate mean, st, sample size, note
2. COYtoTG: sent mean of st variety. TG
3. Calib: check whether trial mean is exceed 10% of st mean.
4. Renew: if no doubt then update lookupvalueID of each note of each Chr.
5. STNT: generate st. note.
6. CKNT: cite CK note if have.
7. RENT: calculate regression note if possible.
8. CheckPhotos: check photos if there is big difference between trials.
9. COYtoCK: send final note to CK.



ANALYSIS OF DISTINCTNESS

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Candidate	Variety	1	2	3	4	5	6	7	8	9	10	11
125	TRUE	NKY328	2	2	3	5	6	3	4	1	1	2	6
126	TRUE	YTN890	4	2	3	6	7	2	3	1	1	2	4
127	TRUE	HTN800	4	2	2	6	7	2	4	9	1	1	5
128	TRUE	NDT	4	2	2	4	5	2	4	9	2	8	6
129	FALSE	MTN6	3	2	2	6	6	3	3	1	2	2	6
130													
131		Correlation cc	JNC788	JK656	XD559	ZJ368	DT12	DK56	MC198	CHY188	CHY988	DD815	DJJ156
132		JNC788	1	0.585	0.635	0.528	0.502	0.571	0.545	0.509	0.766	0.583	0.599
133		HQC609	0.637	0.76	0.736	0.751	0.796	0.66	0.791	0.681	0.83	0.786	0.759
134		JNT768	0.703	0.726	0.747	0.559	0.526	0.596	0.581	0.468	0.661	0.694	0.701
135		MC838	0.613	0.852	0.886	0.804	0.653	0.886	0.712	0.707	0.79	0.894	0.796
136		JK656	0.585	1	0.948	0.821	0.646	0.836	0.801	0.628	0.822	0.896	0.861
137		XD559	0.635	0.948	1	0.776	0.632	0.852	0.785	0.626	0.831	0.9	0.862
138		ZJ368	0.528	0.821	0.776	1	0.711	0.744	0.662	0.492	0.807	0.812	0.697
139		DT12	0.502	0.646	0.632	0.711	1	0.527	0.714	0.525	0.748	0.653	0.567
140		HM9820	0.586	0.831	0.839	0.872	0.652	0.81	0.651	0.5	0.861	0.886	0.766
141		DK56	0.571	0.836	0.852	0.744	0.527	1	0.66	0.748	0.796	0.884	0.835
142		MC198	0.545	0.801	0.785	0.662	0.714	0.66	1	0.636	0.794	0.745	0.696
143		HY607	0.541	0.661	0.663	0.545	0.7	0.518	0.743	0.361	0.778	0.619	0.501
144		JK995	0.589	0.881	0.9	0.774	0.626	0.892	0.724	0.642	0.821	0.923	0.867

Chr.No.	Chr.Name性状名称	JK656-2019	XD559-2019	Diff差异	JK656-2020	XD559-2020	Diff差异
1	First leaf: shape of apex	4	4		4	4	
2	First leaf: intensity of anthocyanin colo	4	4		4	5	1
3	Foliage: intensity of green color	3	3		3	3	
4	Tassel: time of anthesis	56	56		59	58	1
5	Ear: time of silk emergence	58	57	1	60	60	
6	Leaf: angle between blade and stem	2	3	1	2	3	1
7	Leaf: curvature of blade	2	1	1	2	1	1
8	leaf:anthocyanin coloration of margin	1	1		1	1	
9	Ear: intensity of anthocyanin coloratio	2	2		2	2	
10	Tassel: intensity of anthocyanin colorat	5	6	1	5	6	1
11	Tassel: density of spikelets	5	5		5	5	
12	Tassel: intensity of anthocyanin colorat	1	1		1	1	
13	Tassel: intensity of anthocyanin colorat	5	5		5	5	
14	Tassel: intensity of anthocyanin colorat	1	1		1	1	
15	Tassel: angle between main axis and la	5	5		6	5	1
16	Tassel: curvature of lateral branches	1	1		1	1	
17	Tassel: length of main axis above lowe	37.9	43.65	4.7755E-11	41.22	45.015	1.8144E-06
18	Tassel: length of main axis above high	27.95	27.95	1	30.195	30.765	0.33933781
19	Tassel: number of primary lateral bran	12	15.35	8.5449E-05	12.7	14.05	0.02186513
20	Tassel: length of lateral branches	24.075	27.05	8.7611E-05	26.925	28.6	0.02608356
21	Stem: degree of zig-zag	1	1		1	1	
22	Stem: intensity of anthocyanin colorati	4	3	1	4	3	1

ANALYSIS OF UNIFORMITY

Candidate	Variety品种	17	17	17	17	18	18	18	18	19	19	19	19
	ZD958	35.7	35.695	0.8337	1.02547	23.95	23.28	0.888624	0.984918	20.7	21.05	1.238849	0.981848
	ZNT868	39.475	41	1.640852	0.957782	26.6	26.25	1.427659	1.00366	18.95	21.95	1.560741	1.462382
	ZT193	34.825	39.88	0.985886	1.045641	26.15	30.71	0.881759	0.873568	6.95	7.4	0.87319	0.716032
		39.2105	40.586	1.18784	1.171342	26.60433	27.61783	1.08855	1.051931	13.705	14.03667	1.121354	0.974092
	ANOVA方差分	17	18	19	20	23	24	26.2	27.2	28.2	30.2	31.2	32.2
	df of trials试验自	1	1	1	1	1	1	1	1	1	1	1	1
	MS of trials试验	0.004083	0.020115	0.325288	0.022758	0.400328	0.262853	0.007815	0.003912	6.51E-05	0.012598	4.08E-05	0.001072
	df of Error误差自	58	58	58	58	58	58	58	58	58	58	58	58
	MS of Error误差	1.599748	1.490878	1.305752	1.603525	2.289489	0.552762	2.967242	4.021212	0.003506	1.241247	0.115232	0.703248
	df total总自由度	59	59	59	59	59	59	59	59	59	59	59	59
	MS total总均方	1.603831	1.510993	1.631041	1.626283	2.689818	0.815614	2.975058	4.025124	0.003571	1.253845	0.115272	0.70432
	UCp	1.220821	1.110043	1.084973	1.226907	1.656179	0.481189	2.225248	2.431658	0.03035	0.68887	0.183014	0.893156
NU	BMB458	1.108632	1.069883	1.186878	1.178709	1.725415	0.453357	2.159825	2.377125	0.030125	0.822752	0.159036	0.784363
NU	CZ11912	1.392948	1.365468	1.05591	1.339224	1.631327	0.532487	2.269729	2.507058	0.038501	1.015303	0.183092	0.884627
NU	DB7915	1.339674	1.266676	0.987918	1.05523	1.706256	0.405427	2.074451	2.210134	0.025753	0.711975	0.177264	1.006405
NU	DK717	1.030894	0.807033	1.035728	0.962787	1.631042	0.584516	2.275908	2.401924	0.028588	0.594202	0.134143	0.76272
NU	FMJ70	1.155161	0.985535	1.019079	1.206447	1.592866	0.369148	2.092009	2.423405	0.030563	0.74474	0.188045	0.748687
NU	HM9820	1.049482	0.971954	0.889601	1.197437	1.575772	0.4112	1.985673	2.10798	0.024272	0.648422	0.14624	0.984031
NU	HNTY27	1.182963	1.02	1.201558	1.266633	1.426964	0.431707	2.370338	2.276269	0.041377	0.436728	0.214391	0.938236
NU	HQC609	1.234146	1.168969	1.081863	1.246598	1.663891	0.520583	1.972156	2.459608	0.022401	0.582044	0.171601	0.821784
NU	HY607	1.402772	1.241351	1.044701	1.155569	1.69198	0.458007	1.990585	2.462005	0.027923	0.778328	0.194139	0.847147
NU	JK995	1.209561	1.109081	1.151676	1.265514	1.461554	0.528831	1.975802	2.314541	0.019011	0.697767	0.134026	0.83946
NU	JKN2000	1.090554	1.05002	0.766357	0.981328	1.724453	0.346139	1.998293	2.503055	0.017727	0.663454	0.182107	0.869632
NU	JKT633	1.185092	0.852084	0.926009	1.017957	1.570704	0.367254	2.225157	2.305102	0.02916	0.720061	0.273572	0.866051
NU	JN1805	1.052544	0.959573	1.011908	1.181708	1.835798	0.320908	2.264615	2.3224	0.031706	0.686554	0.139314	0.874236
NU	JNT768	1.153611	1.088553	1.125448	1.203069	1.522362	0.477638	2.397733	2.670795	0.030537	0.606157	0.17865	0.858017

Candidate待测	Variety品种	Sample size 总株数-1	Offtypes异型株数-1	U-1
TRUE	A	40	3	U
FALSE	B	40	4	NU
FALSE	C	100	5	U
FALSE	D	100	6	U
FALSE	E	120	7	U
FALSE	F	120	8	NU

ANALYSIS OF STABILITY

No.序号	Variety	CC of note代码相关系数	Not calculate未计算	0	1	2	3	>3	Chr.性状	CC of data原始值相关系数	CC of note代码相关系数	Not calculate未计算	0	1	2	3	>3	Type of observation观测类型
1	BMB458	0.974378	0.022727	0.727273	0.25				1	0.395971	0.395971		0.820313	0.140625	0.039063			VG
2	CZ11912	0.916841	0.090909	0.704545	0.136364	0.022727	0.045455		2	0.822405	0.822405		0.5	0.367188	0.109375	0.023438		VG
3	DBT915	0.9181	0.090909	0.659091	0.159091	0.045455	0.045455		3	0.65359	0.65359		0.851563	0.148438				VG
4	DK717	0.920759	0.113636	0.590909	0.204545	0.090909			4	0.91465	0.833975		0.554688	0.414063	0.03125			MG
5	FM370	0.900889	0.113636	0.477273	0.295455	0.113636			5	0.908549	0.852145		0.53125	0.46875				MG
6	HM9820	0.916044	0.113636	0.590909	0.25	0.045455			6	0.826348	0.826348		0.742188	0.21875	0.03125		0.007813	VG
7	HNTY27	0.973304	0.022727	0.795455	0.181818				7	0.83345	0.83345		0.6875	0.226562	0.070313	0.007813	0.007813	VG
8	HQC609	0.632262	0.113636	0.5	0.295455	0.022727	0.045455	0.022727	8	0.50401	0.50401		0.859375				0.140625	VG
9	HY607	0.599672	0.113636	0.477273	0.340909	0.022727	0.022727	0.022727	9	0.842599	0.842599		0.710938	0.164062	0.078125	0.023438	0.023438	VG
10	JK995	0.912025	0.113636	0.590909	0.204545	0.090909			10	0.904717	0.904717		0.710938	0.1875	0.0625	0.039063		VG
30	ZT193	0.950752	0.113636	0.681818	0.181818	0.022727			30.1	0.843323	0.769022		0.640625	0.335938	0.023438			MS
31	BM380	0.938859	0.022727	0.704545	0.25		0.022727		31.1	0.888701	0.806581		0.15625	0.5	0.320313	0.023438		MS
32	BM4192	0.961568	0.022727	0.727273	0.25				32.1	0.87869	0.793444		0.710938	0.289062				MS
33	BM492	0.970135	0.022727	0.727273	0.25				33	0.226744	0.226744		0.875	0.125				VG
34	BTN1888	0.952902	0.113636	0.568182	0.272727	0.045455			34	1	1		1					VG
35	CHY188	0.738938	0.113636	0.590909	0.227273	0.045455		0.022727	35	0.891054	0.891054	0.835938	0.109375	0.046875	0.007813			VG
36	CHY988	0.70625	0.113636	0.704545	0.113636	0.022727	0.022727	0.022727	36	0.091141	0.091141	0.835938	0.023438	0.109375	0.023438	0.007813		VG
37	CZ1091	0.758321	0.090909	0.522727	0.295455	0.068182		0.022727	37	0.487182	0.487182	0.835938	0.03125	0.101563	0.03125			VG
38	DB1842	0.955108	0.090909	0.727273	0.136364	0.045455			38	0.905269	0.905269	0.835938	0.148438	0.015625				VG
39	DB240	0.960214	0.090909	0.704545	0.159091	0.045455			39	0.970931	0.970931		0.851563	0.109375	0.039063			VG
40	DB2916	0.788781	0.090909	0.340909	0.386364	0.159091		0.022727	40	0.976479	0.976479		0.867188	0.132813				VG
41	DB6910	0.90851	0.090909	0.681818	0.136364	0.068182	0.022727		41	0.924288	0.924288		0.765625	0.179688	0.03125	0.023438		VG
42	DD806	0.94622	0.113636	0.613636	0.25	0.022727			42	0.593923	0.593923		0.65625	0.3125	0.015625	0.015625		VG
43	DD815	0.866325	0.113636	0.477273	0.272727	0.113636	0.022727		43	0.973567	0.973567		0.84375	0.117188	0.03125		0.007813	VG
44	DJ156	0.896447	0.113636	0.340909	0.5	0.045455			44	0.755929	0.755929	0.929688	0.0625	0.007813				VG
45	DK193	0.810879	0.113636	0.454545	0.25	0.136364	0.022727	0.022727	Max最大值	1	1	0.929688	1	0.59375	0.320313	0.046875	0.140625	
46	DK229	0.928848	0.113636	0.431818	0.409091	0.045455			Mean均值	0.75288	0.733779	0.854688	0.597656	0.249628	0.070549	0.019097	0.027344	
47	DK56	0.817339	0.113636	0.386364	0.409091	0.045455	0.022727	0.022727	Min最小值	0.091141	0.091141	0.835938	0.023438	0.007813	0.007813	0.007813	0.007813	
127	ZP1	0.590972	0.113636	0.409091	0.318182	0.068182	0.045455	0.045455										
128	ZT192	0.901509	0.113636	0.340909	0.522727	0.022727												
	Max最大值	0.986119	0.113636	0.863636	0.522727	0.181818	0.068182	0.045455										
	Mean均值	0.885767	0.097154	0.597656	0.238281	0.06571	0.030303	0.01566										
	Min最小值	0.543255	0.022727	0.340909	0.090909	0.022727	0.022727	0.022727										

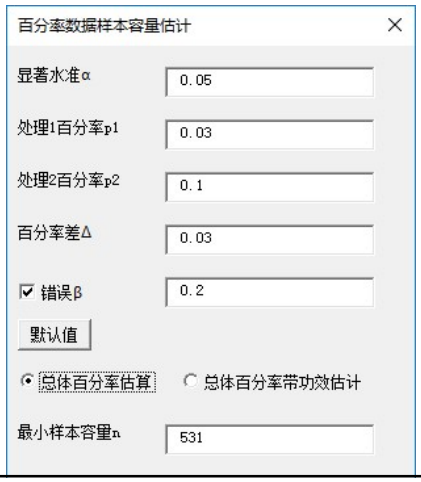
CHECK AND RENAME PHOTO FILES

	A	B	C	D	E	F
1	OldName	Type	Address	NewName	Photo1	Photo2
2	1.jpg	文件	D:\西葫芦\2020\2017-0971A			
3	2.jpg	文件	D:\西葫芦\2020\2017-0971A			
4	3.jpg	文件	D:\西葫芦\2020\2017-0971A			
5	4.jpg	文件	D:\西葫芦\2020\2017-0971A			

VERIFICATION OF CHARACTERISTICS AND TRIAL

Estimate sample size by normal data

Estimate sample size by rate data



APPLICATIONS IN MAIZE

- 44 Characteristics, including 4 for sweet corn only,1 for pop corn only, including 30 VGs, 2 MGs, 12 MSs.
- 128 varieties, including 98 candidate and 30 similar varieties, including 82 sweet corn varieties, 12 pop corn varieties.
- 2 years, 2019-2020

APPLICATIONS IN MAIZE

Results:

Distinctness: 8 of 8128 pairs have more than 95% correlation coefficient; 142 of 8128 pairs have correlation coefficient between 90% and 95%.

Stability:

cc of varieties between years

<60%	60-70%	70-80%	80-90%	>90%
5	6	12	22	83

cc of characteristics between years

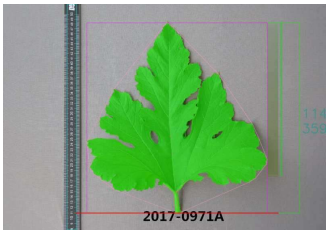
<50%	50-60%	60-70%	70-80%	80-90%	90-100%	100%
4	3	4	8	14	9	1

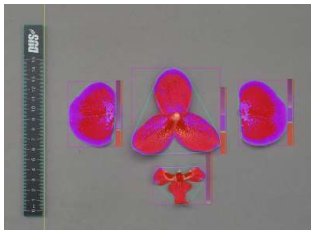
DISCUSSION

- Different methods have different result, how to solve this problem?
- Least Distance is same or not same as between candidate and similar for D, or between normal and off-type for U, or between two samples for S?
- Most wrong results are caused by VG, do we need VG any more?
- Two varieties have significant but not same way difference in QN characteristics, are they distinct or not?

FUTURE PLAN

- So far we have developed a new big data internet platform for DUS. We created some image analysis and statistical analysis algorithms which could be called by the platform.
- We will add more algorithms in future.





THANK YOU FOR YOUR ATTENTION!

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