UPOV TWC

Thirty-Second Session

Helsinki, Finland, June 3 to 6, 2014

Variation of variety descriptions over years in different locations

Experts from China

Premises

- **Suitable locations**

  - e.g. 15 of 29 rice example varieties can not heading normally in Gongzhuling*, otherwise heading normally in Hangzhou* and Guangzhou*. (*YANG et al. 2010*);

- **All the data provided by the office of PVP, MOA, P. R. China;**

* Gongzhuling: northeast of China;
  Hangzhou: middle of China;
  Guangzhou: south of China.

Contents

- **Variation of one variety descriptions beyond all basic characteristics 2 years in 6 different locations in China;**

- **Variation of 10 measured quantitative characteristics of 5 varieties in 6 different locations in China.**

Variation of variety descriptions

-one variety in different locations over 2 years

- **Variety:** Zhengdan 958 (hybrids, *Zea mays* L.);
- **Locations:** Nanjing(NJ), Jinan(JN), Yangling(YL), Urumchi(UR), Gongzhuling(GZL), Harbin(HB);
- **Years:** 2012 and 2013.
- **Description:** on the basis of all the basic characteristics used in national Maize DUS testing guideline.

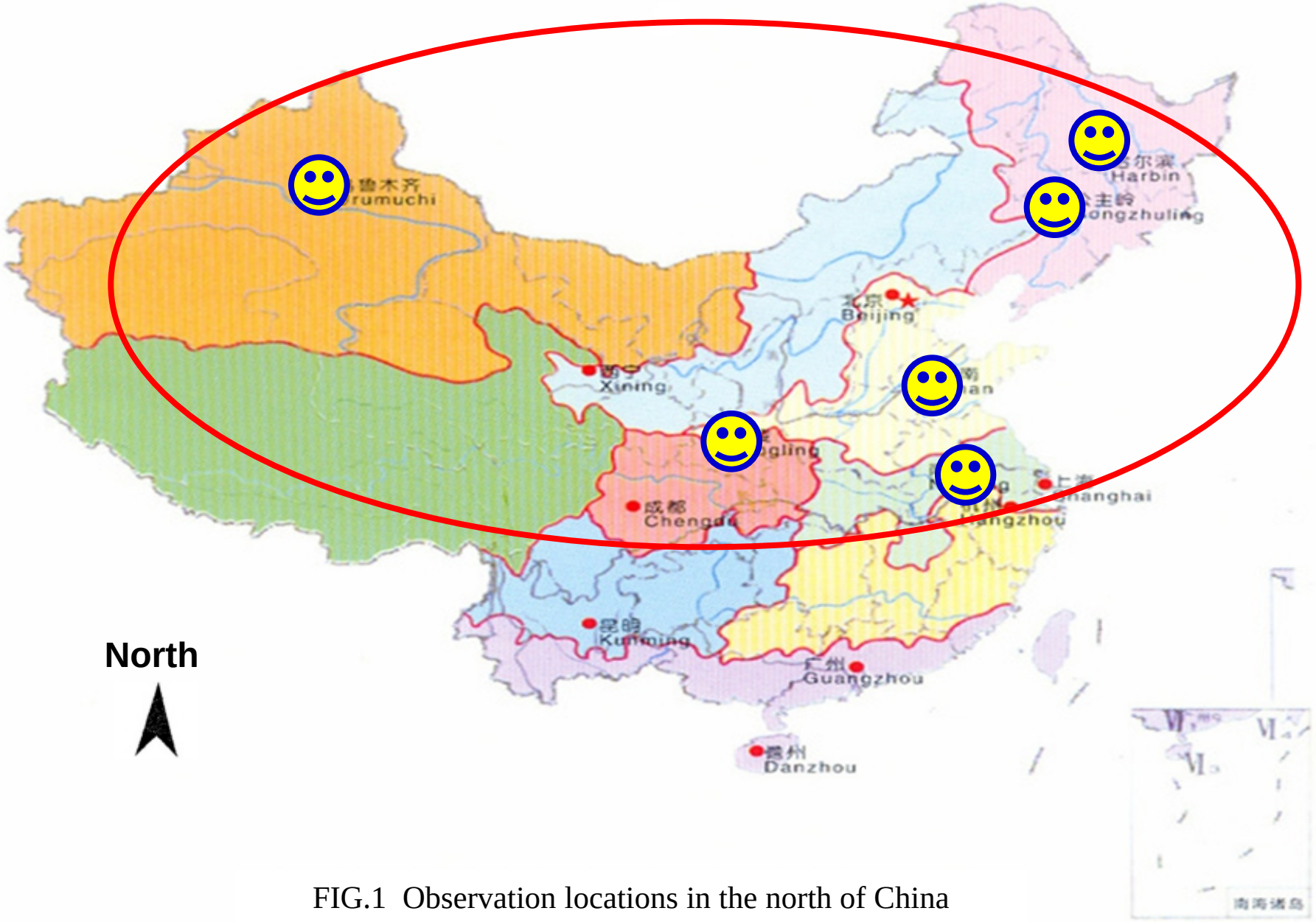

FIG.1 Observation locations in the north of China

Variation of variety descriptions

-one variety in different locations over 2 years

- **Type of characteristics(Ch.):** QL/PQ/QN;
- **Qualitative characteristic(QL)**:

  Ch.33: Ear： number of colors of grains

TAB 1. Description note of number of colors of grains in six places

Location	NJ	JN	YL	UR	GZL	HB	Description
Note(2012)	1	1	1	1	1	1	one color
Note(2013)	1	1	1	1	1	1	one color

No variation in QL

Variation of variety descriptions
-one variety in different locations over 2 years

- **Pseudo-Qualitative Characteristics(PQs)**:

TAB 2. Description note of pseudo-qualitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.2 First leaf：shape of apex	2012	3	3	3	3	3	3	3 rounded
	2013	3	3	3	3	3	3	
Ch.39 ear: color of top of grain	2012	3	3	3	3	3/4	3	3 yellow 4 yellow orange
	2013	3	3	3	3	3	3	
Ch.40 ear: color of dorsal side of grain	2012	3	5	4/5	4	4	3	3 yellow 4 yellow orange 5 orange
	2013	3/4	5	4/5	4	4	3	
Ch.41 Grain：shape	2012	4	4	4	4	4	4	4 nearly wedged-shaped
	2013	4	4	4	4	4	4	

No significant variation in PQs

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 3. Description note of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.1 First leaf: anthocyanin coloration of sheath	2012	6	6	6/7	7	7	6	6 medium to strong; 7 strong
	2013	6	7	6	6	7	7	
Ch.7 Leaf: angle between blade and stem	2012	3	2	3	3	3	2	2 very small to small; 3 small
	2013	3	3	3	3	2	2	
Ch.8 Leaf: curvature of blade	2012	3	2	3	2	3	2	2 absent to slightly recurved 3 Slightly recurved
	2013	3	3	2/3	2	2	3	
Ch.9 Tassel: anthocyanin coloration at base of glume	2012	1	1	1	1	1	1	1 Absent or very weak
	2013	1	1	1	1	1	1	

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 3. Description note of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.10 tassel: anthocyanin coloration of glumes excluding base	2012	2	1	1	1	2	1	1 Absent or very weak; 2 very weak to weak
	2013	2	1	1	1	2	1	
Ch.11 tassel: anthocyanin coloration of anthers	2012	3	2	3	3	3	2	2 very weak to weak 3 weak
	2013	3	3	3	3	2	2	
Ch.12 Tassel: density of spikelets	2012	5	5	5	6	6	5	5 medium 6 medium to moderately dense
	2013	5	5	5	6	5	5	
Ch.13 tassel: angle between main axis and lateral branches	2012	3	3	3	4	3	3	3 small 4 small to medium
	2013	3	3	3	4	3	3	

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 3. Description note of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.14 tassel: curvature of lateral branches	2012	1	1	1	1	1	1	1 absent or very slightly recurved
	2013	1	1	1	1	1	1	
Ch.15 Ear: anthocyanin coloration of silks	2012	3/5	3/4	5	4	5	5	3 weak 4 weak to medium 5 medium
	2013	3/4/5	3	5	4	3/4	5	
Ch.20 Stem: degree of zig-zag	2012	1/2	2	2	1	2	2	1 absent or very slight; 2 slight
	2013	2	2	1/2	1	1/2	1	
Ch.21 stem：anthocyanin coloration of brace roots	2012	5/7	3	4	6	1/2	3	How to handle???
	2013	2/3	3	4	6	1	3	

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 3. Description note of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.23 Foliage: intensity of green color	2012	3	2	2	2/3	3	2	2 medium 3 dark
	2013	2/3	3	2	2	3	2	
Ch.24 Leaf: anthocyanin coloration of sheath	2012	3	1	1	1	1	3	1 Absent or very weak; 3 weak
	2013	2	1	1	1	1	1	
Ch.28 Peduncle: length	2012	3	2	1/2	3	3	3	1 very short; 2 very short to short; 3 short
	2013	1/2	1/2	1	1	2	3	
Ch.32 Ear: shape	2012	2	3	2	3	3	2	2conico-cylindrical 3 Cylindrical
	2013	2	3	2	3	3	2	

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 3. Description note of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.38 Ear: type of grain	2012	4	2/3	3	3	3	4	2 flint-like 3 intermediate 4 dent-like
	2013	3	2	3	3	3	3	
Ch.42 Ear: anthocyanin coloration of glumes of cob	2012	1	1	1	1	1	1	1 Absent or very weak;
	2013	1	1	1	1	1	1	

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 4. Measured value of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Ch.4 Tassel: time of anthesis	**2012**	62.50	55.64	60.80	64.00	68.10	70.33	55.64	70.33	14.70	63.56	5.26	0.083
	2013	68.25	55.90	63.64	59.00	59.75	71.00	55.90	71.00	15.10	62.92	5.81	0.092
Ch.5 Ear: time of silk emergence	**2012**	62.50	55.30	60.80	68.00	66.70	71.00	55.30	71.00	15.70	64.05	5.66	0.088
	2013	66.75	57.70	64.36	61.00	59.25	71.67	57.70	71.67	13.97	63.46	5.21	0.082

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 4. Measured value of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Ch.16 Tassle: length of main axis above lowest lateral branch	**2012**	31.07	35.04	35.44	35.05	35.81	37.82	31.07	37.82	6.75	35.04	2.20	0.063
	2013	33.79	32.24	33.90	36.55	35.61	32.21	32.21	36.55	4.34	34.05	1.76	0.052
Ch.17 Tassle: length of main axis above highest lateral branch	**2012**	23.10	25.81	25.29	22.80	26.13	25.75	22.80	26.13	3.33	24.81	1.47	0.059
	2013	24.82	24.65	24.02	24.85	24.76	22.74	22.74	24.85	2.11	24.31	0.83	0.034
Ch.18 Tassel: number of primary lateral branches	**2012**	10.85	14.10	10.06	19.25	14.81	16.47	10.06	19.25	9.19	14.26	3.45	0.242
	2013	12.91	9.42	10.57	16.35	19.38	16.88	9.42	19.38	9.96	14.25	3.91	0.274
Ch.19 tassel: length of	**2012**	16.90	20.34	21.04	22.15	20.76	22.27	16.90	22.27	5.37	20.57	1.96	0.095
	2013	18.79	17.06	18.84	22.98	19.86	18.71	17.06	22.98	5.93	19.37	1.98	0.102

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 4. Measured value of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Ch.22 Leaf: width of blade	2012	10.62	9.87	10.08	10.13	11.40	11.07	9.87	11.40	1.52	10.53	0.61	0.058
	2013	10.62	9.06	9.51	10.30	11.17	11.35	9.06	11.35	2.29	10.34	0.91	0.088

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 4. Measured value of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Ch.25 Plant：height of insertion of peduncle	2012	84.18	89.58	94.89	128.25	142.26	141.27	84.18	142.26	58.08	113.40	26.81	0.236
	2013	78.00	83.29	105.52	120.00	125.67	111.70	78.00	125.67	47.67	104.03	19.45	0.187
Ch.26 Plant：length	2012	204.95	224.31	226.32	275.35	296.82	290.47	204.95	296.82	91.87	253.03	39.16	0.155
	2013	200.26	215.89	247.20	265.10	283.88	261.77	200.26	283.88	83.61	245.68	31.77	0.129
Ch.27 Plant: ratio height of insertion of peduncle of upper ear to plant length	2012	0.41	0.40	0.43	0.47	0.48	0.49	0.40	0.49	0.09	0.45	0.04	0.085
	2013	0.39	0.39	0.43	0.45	0.44	0.43	0.39	0.45	0.07	0.42	0.03	0.065

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 4. Measured value of quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Ch.29 Ear：length	2012	15.78	17.46	17.64	19.86	18.05	20.87	15.78	20.87	5.09	18.28	1.82	0.100
	2013	15.77	17.78	17.91	19.84	19.83	17.39	15.77	19.84	4.08	18.09	1.56	0.086
Ch.30 Ear：diameter	2012	4.81	5.05	4.74	5.35	5.25	5.47	4.74	5.47	0.73	5.11	0.30	0.058
	2013	4.79	4.81	4.97	5.22	5.45	5.24	4.79	5.45	0.66	5.08	0.27	0.052
Ch.31 Ear：number of rows of grain	2012	15.00	15.74	15.27	16.80	15.52	15.90	15.00	16.80	1.80	15.70	0.63	0.040
	2013	15.18	14.06	14.68	16.10	16.25	15.27	14.06	16.25	2.19	15.25	0.83	0.055

Variation of variety descriptions
-one variety in different locations over 2 years

- **Quantitative characteristics(QNs)**:

TAB 5. Description note of 3 measured quantitative characteristics in six places

Ch. \ Location		NJ	JN	YL	UR	GZL	HB	Description
Ch.18 Tassel: number of primary lateral branches	2012	4	5	4	7	5	7	4 few to medium 5 medium 6 medium to many 7 many
	2013	5	4	4	6	7	5/6/7	
Ch.25 Plant: height of insertion of peduncle	2012	5	5	4	7	7	7	4 short to medium 5 medium 6 medium to long 7 long
	2013	4/5	5/6	5	7	6	5	
Ch.26 Plant: length	2012	5/6	6	4	6	6	6	4 short to medium 5 medium 6 medium to long
	2013	4	4	5	6	5	4	

Results

-No variation in QL;

-No significant variation in PQs;

-Significant variation in some QNs in different locations;

-No significant variation of QNs observed by visual assessment between years in the same location;

-Coefficient of variation of 3 measured QNs is more than 10%.

Contents

Variation of one variety descriptions beyond all basic characteristics 2 years in 6 different locations in China;

- **Variation of 10 measured quantitative characteristics of 5 varieties in 6 different locations in China.**

Variation of variety descriptions

-5 varieties in different locations with 10 QNs

- **Varieties:** Mo17, Dan340, Shen137, Danyu13, Zhong451 (*Zea mays* L.);
- **Locations:** Danzhou(DZ), Guangzhou(GZ), Chengdu(CD), Jinan(JN), Gongzhuling(GZL), Harbin(HB);
- **Year:** 2012;
- **Description:** only on the basis of 10 measured quantitative characteristics.

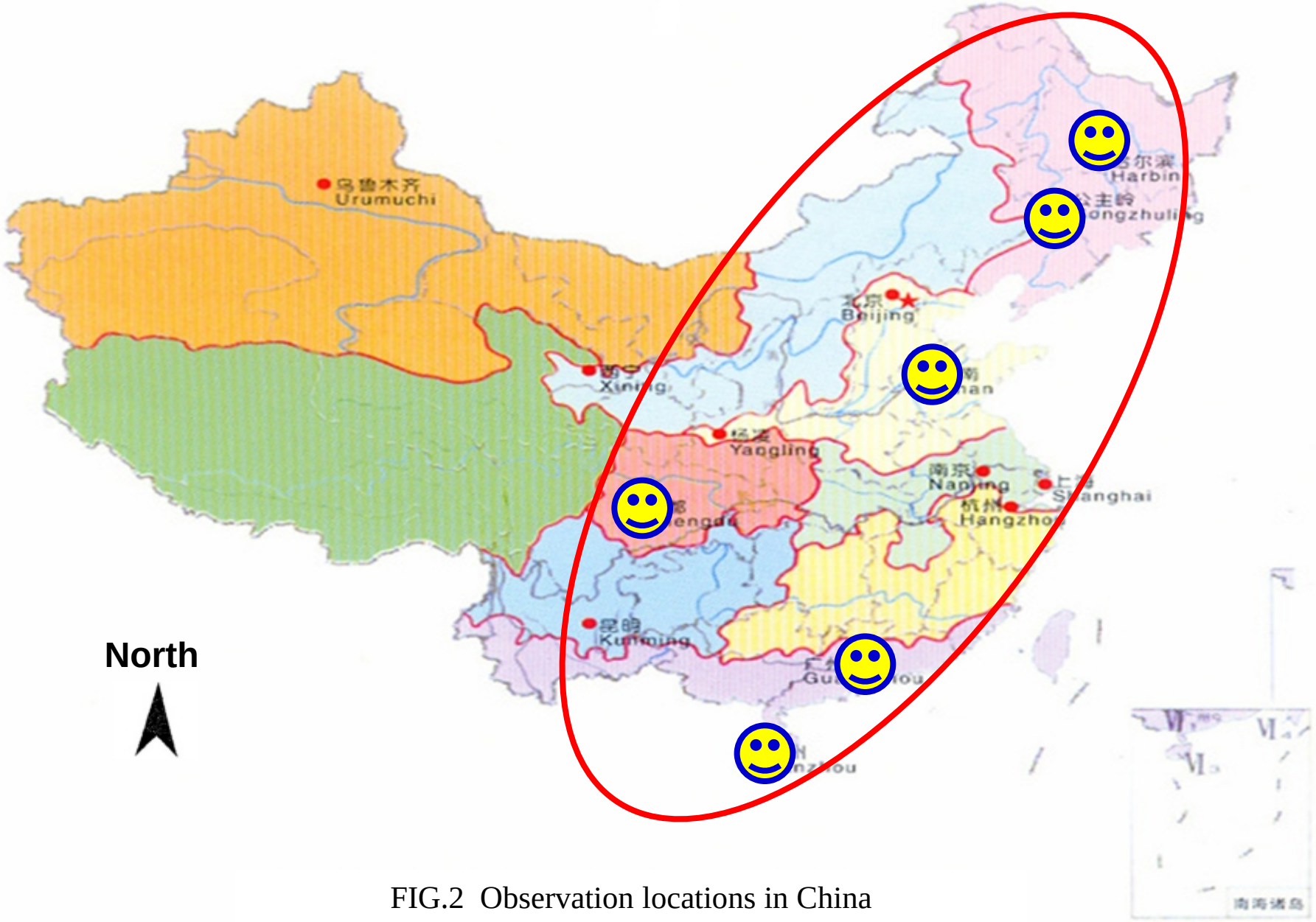

FIG.2 Observation locations in China

Variation of variety descriptions
-5 varieties in different locations with 10 QNs

- **Tassel: number of primary lateral branches**

TAB 6. Record of number of primary lateral branches of 5 varieties in 6 different locations

Variety \ Location	DZ	GZ	CD	JN	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Mo17	7.32	3.00	5.00	4.10	7.30	7.00	3.00	7.32	4.32	5.62	1.85	0.330
Dan340	9.18	7.00	9.00	14.50	16.40	16.20	7.00	16.40	9.40	12.05	4.13	0.343
Shen137	7.52	7	11.8	11	15.4	18	7	18	11	11.787	4.322	0.367
Danyu13	9.97	9.00	20.80	19.80	17.11	15.50	9.00	20.80	11.80	15.36	4.94	0.321
Zhong451	3.87	3.00	5.60	7.30	7.44	5.00	3.00	7.44	4.44	5.37	1.79	0.334

◆ Tassel: number of primary lateral branches

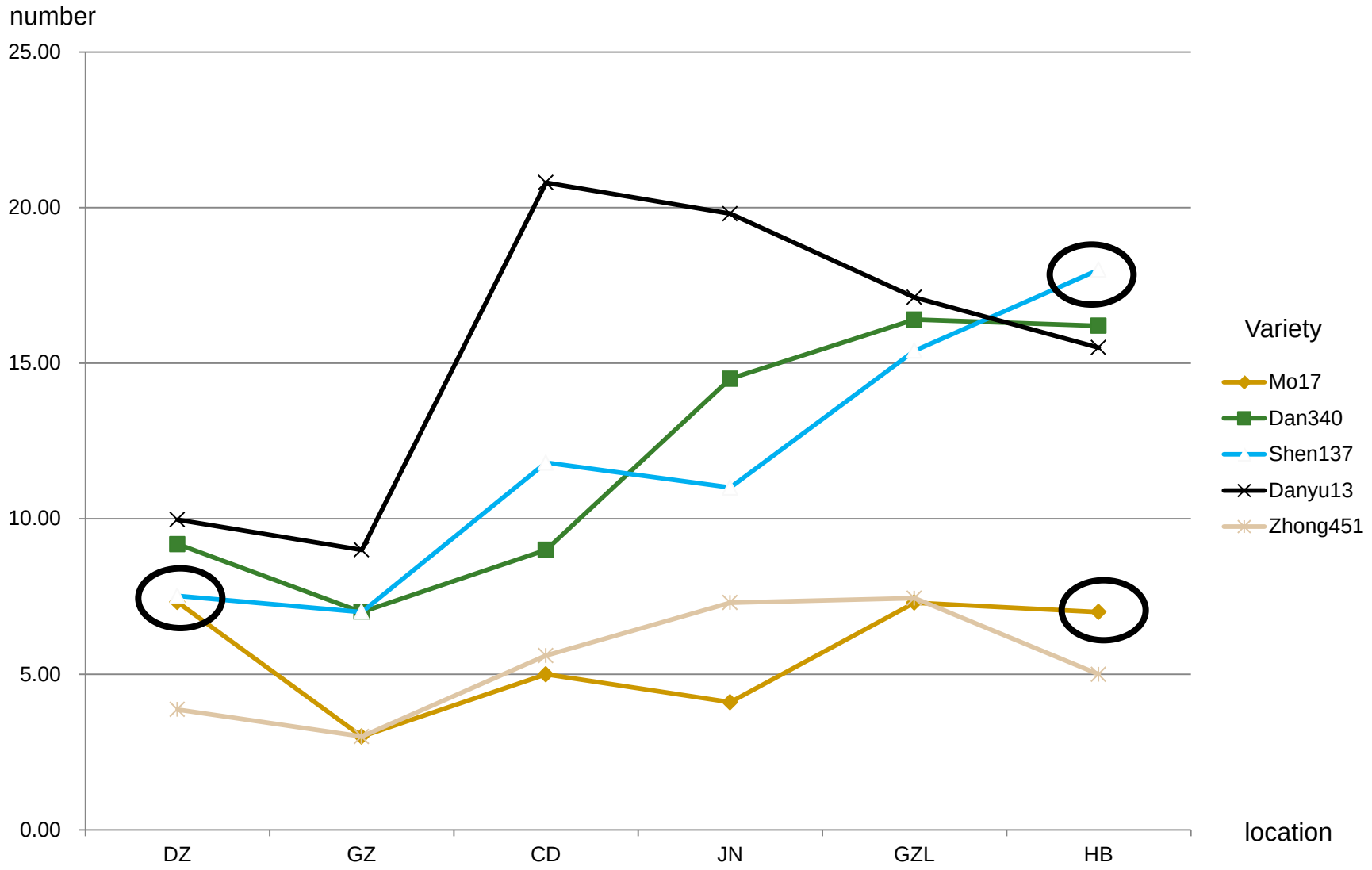

FIG.3 Record of the number of primary lateral branches in 6 different locations

Variation of variety descriptions
-5 varieties in different locations with 10 QNs

- **Plant: height of insertion of peduncle**

TAB 7. Record of height of insertion of peduncle of 5 varieties in 6different locations places

Variety \ Location	DZ	GZ	CD	JN	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Mo17	56.81	48.50	43.80	49.60	88.00	79.90	43.80	88.00	44.20	61.10	18.36	0.301
Dan340	34.85	32.20	48.00	69.80	83.94	82.40	32.20	83.94	51.74	58.53	23.27	0.398
Shen137	44.41	38.86	78.00	71.33	117.11	110.25	38.86	117.11	78.25	76.66	32.45	0.423
Danyu13	54.56	50.32	83.80	77.60	107.17	105.00	50.32	107.17	56.85	79.74	24.13	0.303
Zhong451	54.34	52.22	79.60	63.50	95.22	85.55	52.22	95.22	43.00	71.74	17.64	0.246

◆ Plant: height of insertion of peduncle

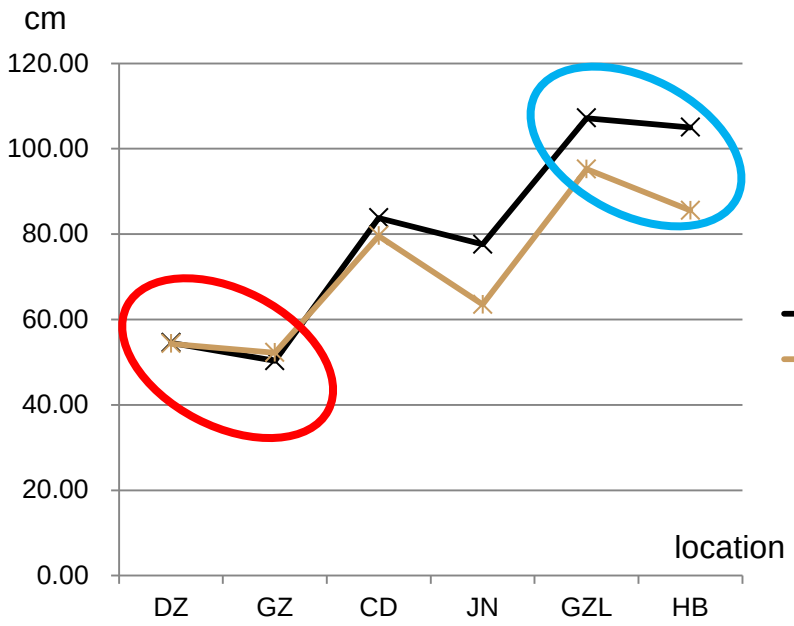

FIG.4 Record of the height of insertion of peduncle (hybrids) in 6 different locations

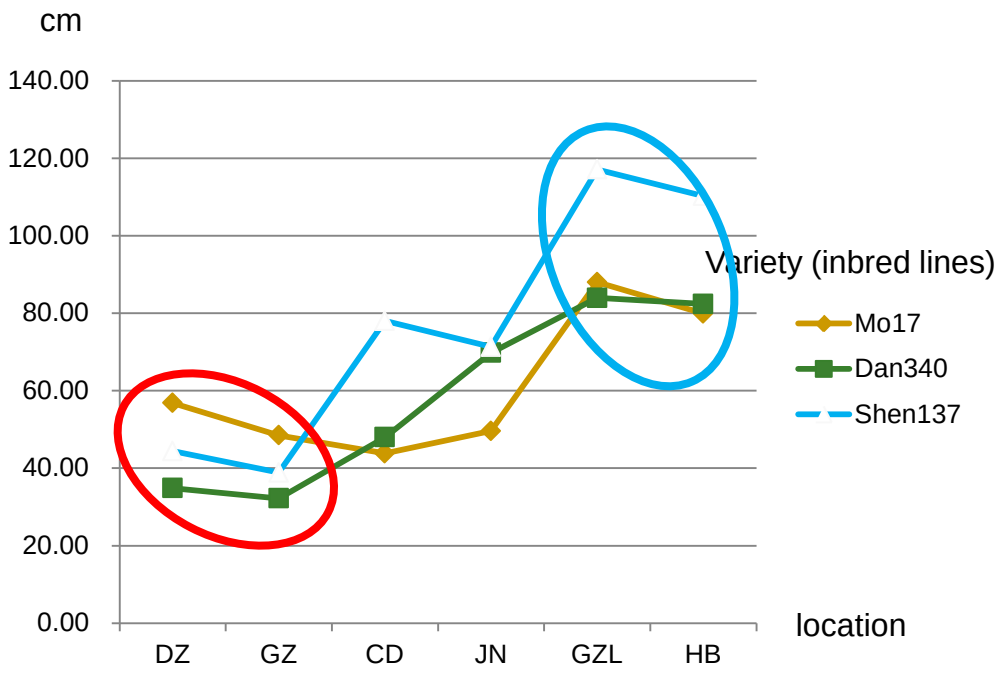

FIG.5 Record of the height of insertion of peduncle (inbred lines) in 6 different locations

Variation of variety descriptions
-5 varieties in different locations with 10 QNs

- **Plant: length**

TAB 8. Record of plant length of 5 varieties in 6different locations places

Variety \ Location	DZ	GZ	CD	JN	GZL	HB	MIN.	MAX.	RANGE	MEAN	SD	CV
Mo17	169.82	126.05	169.00	172.10	214.90	212.85	126.05	214.90	88.85	177.45	33.03	0.186
Dan340	124.42	113.76	149.00	188.90	215.89	207.60	113.76	215.89	102.13	166.59	43.56	0.261
Shen137	135.04	119.16	184.80	180.33	264.78	210.85	119.16	264.78	145.62	182.49	52.63	0.288
Danyu13	168.56	163.34	220.60	192.40	264.22	254.85	163.34	264.22	100.88	210.66	43.05	0.204
Zhong451	169.35	165.64	225.00	209.80	238.44	223.85	165.64	238.44	72.81	205.35	30.71	0.150

◆ Plant: length

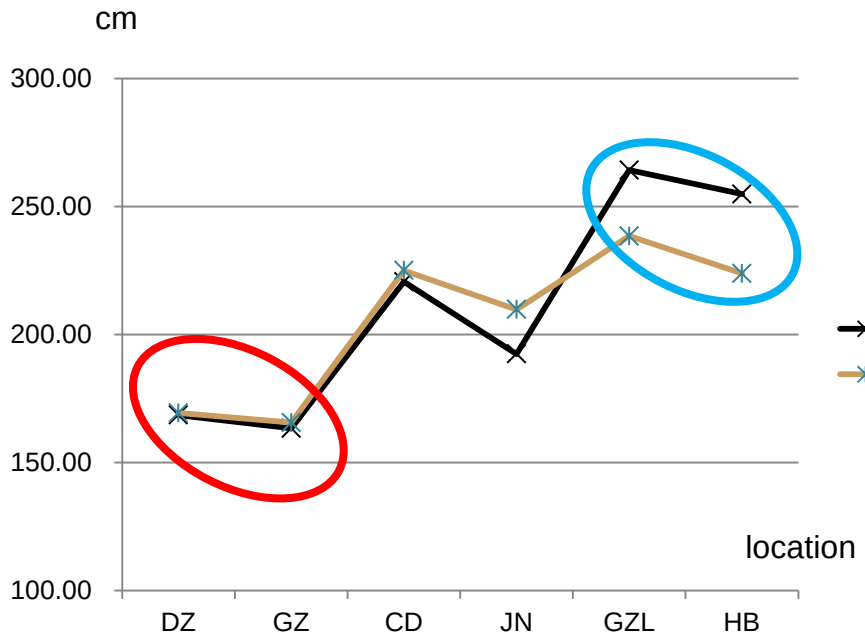

FIG.6 Record of the length of plant (hybrids) in 6 different locations

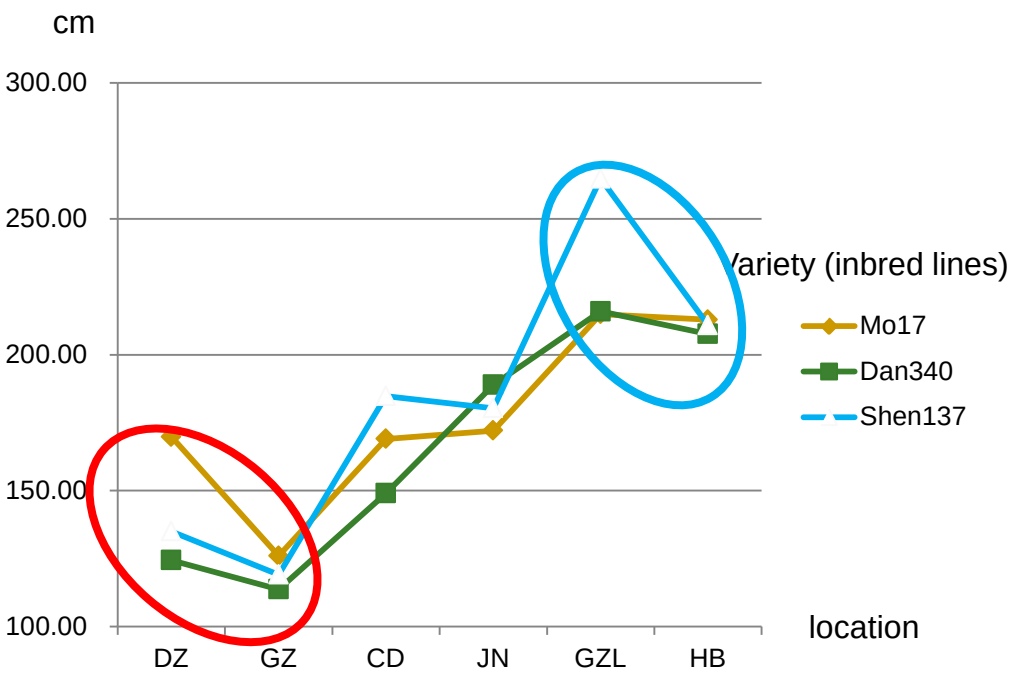

FIG.7 Record of the length of plant (inbred lines) in 6 different locations

Variation of variety descriptions
-5 varieties in different locations with 10 QNs

TAB 9. Coefficient variation of 6 varieties in 10 different QNs

Ch. / Variety	Ch.16	Ch.17	Ch.18	Ch.19	Ch.22	Ch.25	Ch.26	Ch.29	Ch.30	Ch.31
Mo17	0.127	0.068	0.330	0.269	0.101	0.301	0.186	0.087	0.226	0.076
Dan340	0.157	0.134	0.343	0.170	0.118	0.398	0.261	0.212	0.185	0.206
Shen137	0.108	0.119	0.367	0.092	0.067	0.423	0.288	0.146	0.103	0.143
Danyu13	0.112	0.062	0.321	0.205	0.075	0.303	0.204	0.118	0.114	0.061
Zhong451	0.141	0.072	0.334	0.217	0.089	0.246	0.150	0.154	0.118	0.158
Zhengdan958	0.057	0.047	0.258	0.099	0.073	0.212	0.142	0.093	0.055	0.047

Variation of variety descriptions

-5 varieties in different locations with 10 QNs

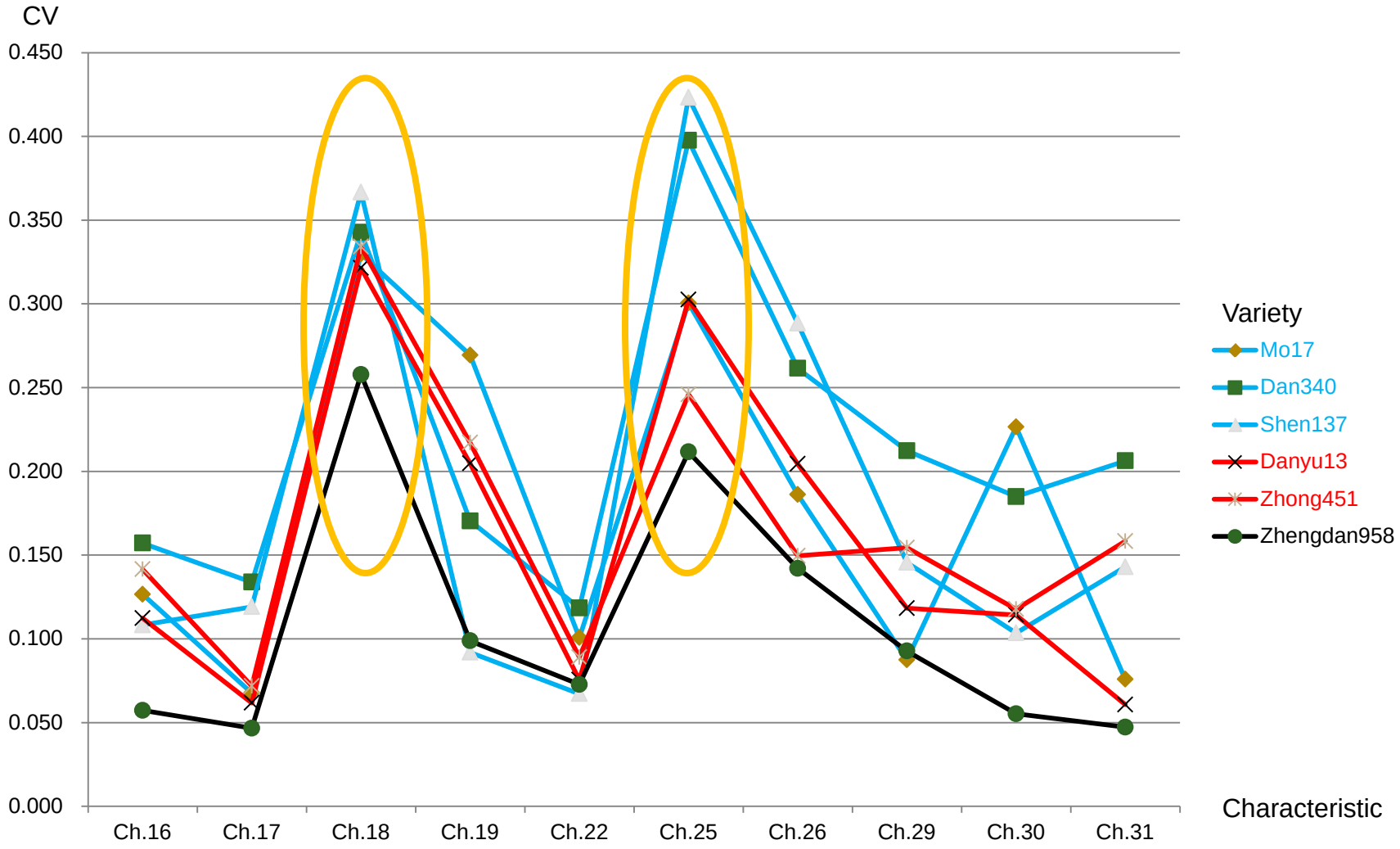

FIG.8 Coefficient Variation of 6 varieties in 10 measured QNs

Results

-Ch.18 and Ch.25 have more variations than the other characteristics (FIG.8);

- CV Value of QN is different (TAB.9) ;

- Variation tendency of CV Value of QN is generally consistent (TAB.9, FIG8) .

Variation of variety descriptions

-5 varieties in different locations with 10 QNs

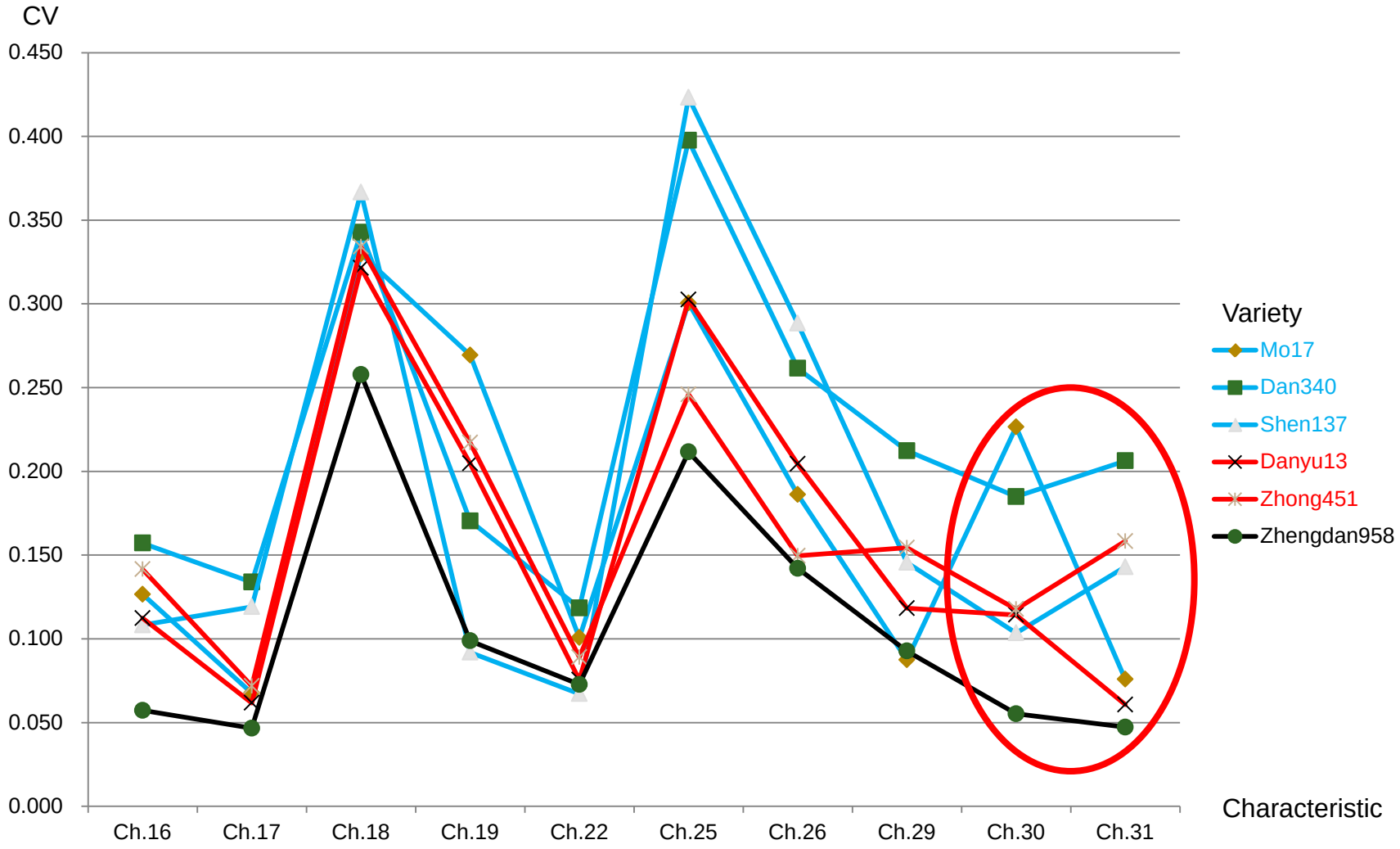

FIG.8 Coefficient Variation of 6 varieties in 10 measured QNs

Results

-Latitudinal discrepancies may play more important role in variation of variety descriptions than longitudinal discrepancies (TAB.9) ;

- Descriptions of varieties could be various in different locations;

e.g. The number of primary lateral branches of Shen137 and Mo17 are 7.52 and 7.32 in DZ separately, while 18 and 7 in HB (FIG.3) .

- Variation of different varieties in some locations is tend to be consistent (FIG.4,5,6,7) .

Conclusions

- **Choosing QLs or PQs as grouping characteristics is real and effective;**
- **Recently, It's very hard to give only one description for a variety in China;**
- **A relative permanent description of a variety is more likely to be done in very similar latitudes or ecotope in China.**

Question

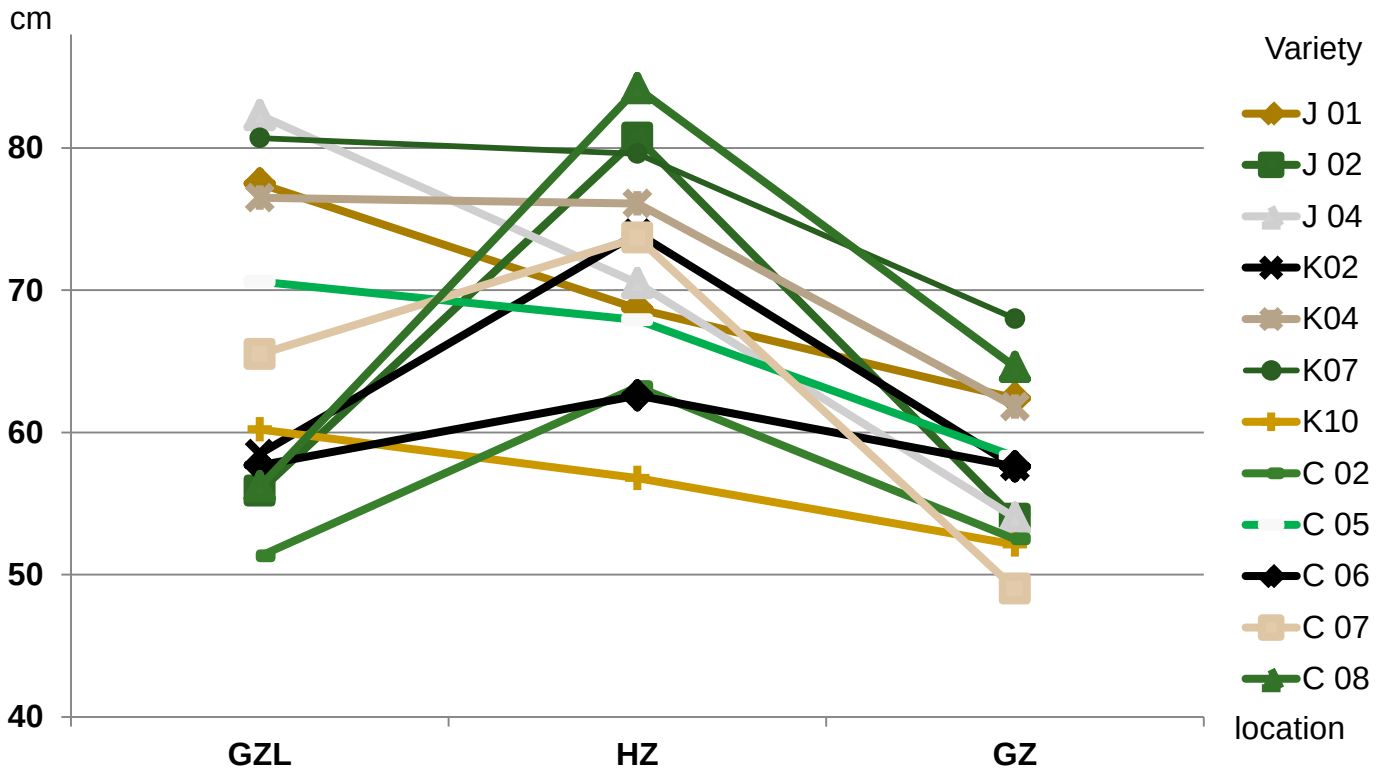

FIG.9 Record of the stem length (excluding panicle) of 12 varieties of rice (*Oryza sativa* L.) in 3different locations

How to figure it out?

* GZL: northeast of China;
  HZ: middle of China;
  GZ: south of China.

Thanks for your attention!