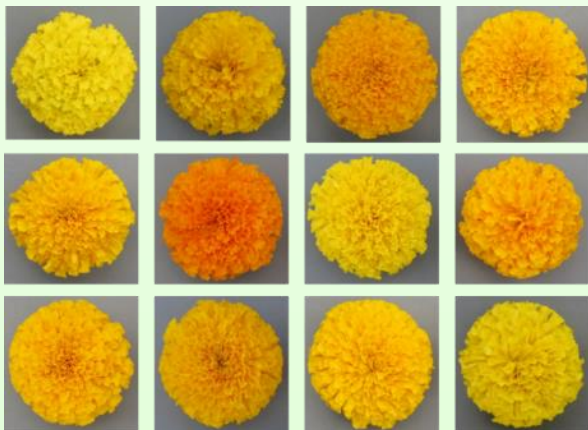# Example Variety

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Contents

What is Example Varieties？

    ✓ Purpose of example varieties

    ✓ Criteria of example varieties

How to use Example Varieties

How to set up Example Varieties

Evaluation of characteristics

Can you evaluate this characteristics without Example Varieties ?

4	40 VG	Leaf: anthocyanin coloration	Example variety	Notes
QL	(a)	absent		1
		present		9

32	60. VS	Panicle: awns	Example variety	Notes
QL		absent		1
		present		9

Evaluation of characteristics

2	40 VS	Basal leaf: sheath color	Example variety	Notes
PQ		green		1
		green with purple lines		2
		light purple		3
		purple		4

| 11 (+)	40 VS	Leaf: shape of ligule	Example variety	Notes
PQ	(a)	truncate		1
		acute		2
		cleft		3

1	2	3
truncate	acute	cleft

Evaluation of characteristics

26 (*)	70 VS	Stem length (excluding panicle)	Example variety	Notes
QN		very short	Lampo, Leda	1
		short	Loto, Thaibonnet	3
		medium	Ariete, Bahia	5
		long	Baldo	7
		very long	Carnaroli	9

Medium !!

medium to short ?

Evaluation of characteristics

3	40 VG	Leaf: intensity of green color	Example variety	Notes
QN	(a)	light		3
		medium		5
		dark		7
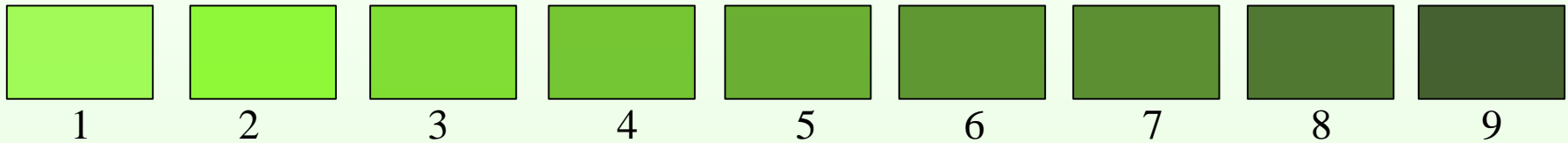
CPVO's TG

1	40 VG	Leaf: intensity of green color	Example variety	Notes
QN		light	Lemont	3
		medium	Bahia	5
		dark	Puntal	7

Purpose of Example Variety

Clarify the states of expression of characteristics

      (a) to illustrate "state of expression" of a characteristics and/or

      (b) to provide appropriate "states of expression" to each variety
      (Bio-ruler for a state of expression in QN)

                   ⬇

✓ *harmonized approach for characterization*

                   ⬇

reduce the difference in the characterization result by the testing place and the testing year.

Purpose of Example Variety

(a) **to illustrate "state of expression" of a characteristics**   **TG/016 Rice**

| 39 (*) (+)	90 VG	Panicle: attitude in relation to stem	Example variety	Notes
PQ		upright	Elio, Roncolo	1
		semi-upright	Ariete, Lido	2
		slightly drooping	Guadiamar, Thaibonnet	3
		strongly drooping	Galatxo, Vialone Nano	4
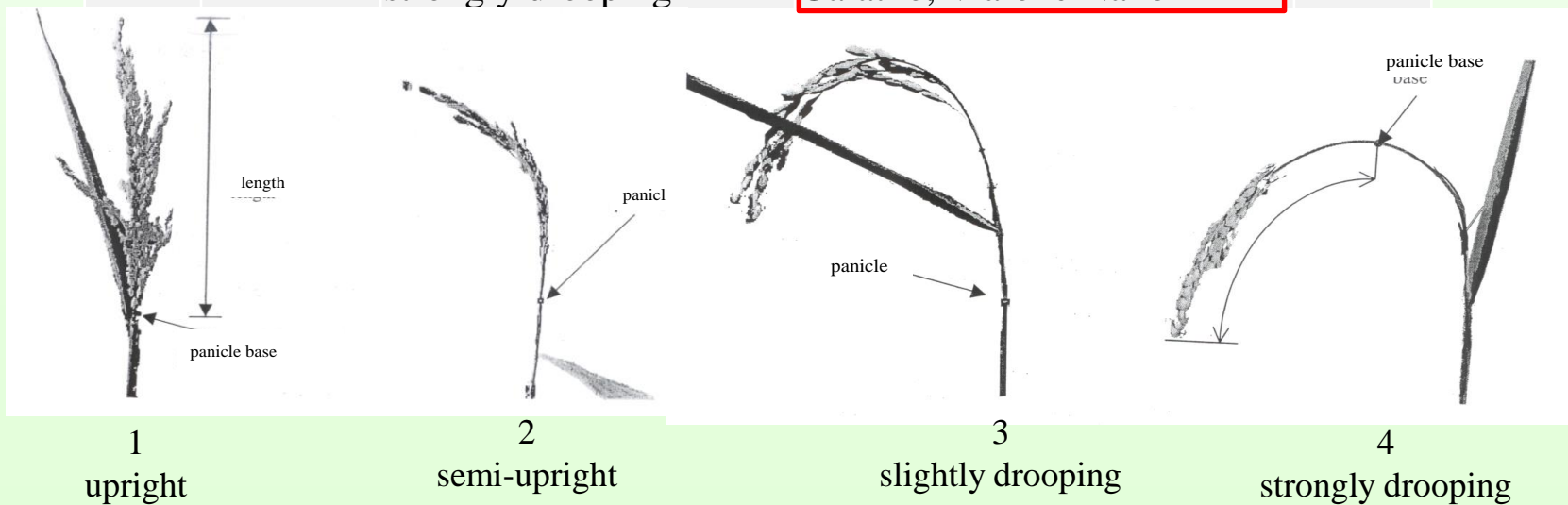
1
upright

2
semi-upright

3
slightly drooping

4
strongly drooping

Purpose of Example Variety

(a) to illustrate "state of expression" of a characteristics

6. (*) (+)	Leaf: type	Example variety	Notes
QL	simple		1
	ternate		2
	biternate		3
	triternate		4
	pinnate		5
	bipinnate		6
	tripinnate		7
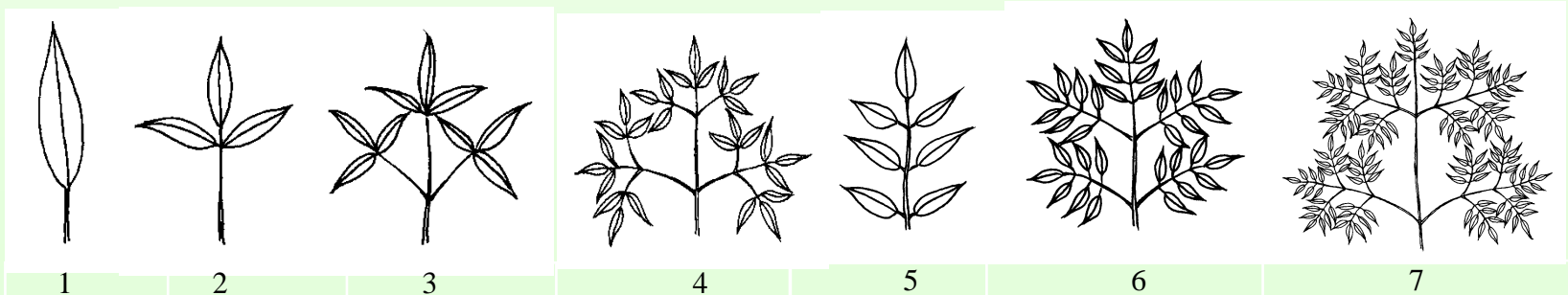
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

19 (*)	55 VG	Time of heading (50% of plants with heads)	Example variety	Notes
QN		very early	Loto	1
		early	Albada, Cripto	3
		medium	Ariete, Bahia	5
		late	Bomba, Puntal	7

Purpose of Example Variety

What is Example Variety?

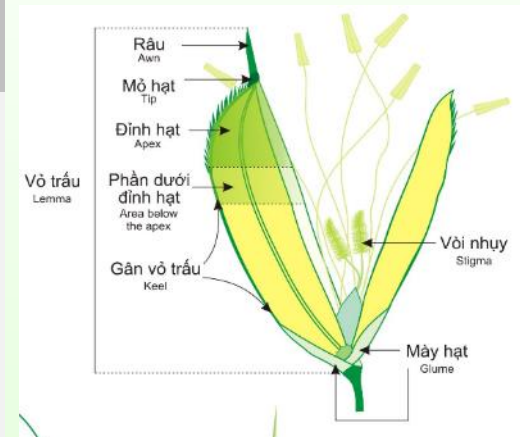**(b) to provide appropriate "states of expression" to each variety**

23 (*) (+) QN	65. VS	Lemma: anthocyanin coloration of apex (early observation)	Example variety	Notes
		absent or very weak	Ariete, Bomba	1
		weak	Thaibonnet	3
		medium	Cripto	5
		strong	Elio, Puntal	7
		very strong	Arborio	9

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

26 (*)	70 VS	Stem length (excluding panicle)	Example variety	Notes
QN		very short	Lampo, Leda	1
		short	Loto, Thaibonnet	3
		medium	Ariete, Bahia	5
		long	Baldo	7
		very long	Carnaroli	9

Panicle base

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

■ **Absolute measurement and Relative measurement**

● **Absolute measurement**

	length	note
Leaf blade: length		
short	30 ~ 34.9	3
Short to medium	35 ~ 39.9	
medium	40 ~ 44.9	5
Medium to long	45 ~ 49.9	
long	50 ~ 54.9	7

● **Relative measurement**

	Example varieties	note
Leaf blade: length		
short	A	3
medium	B	5
long	C	7

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Absolute measurement**

	length	note
(QN) Leaf: length		
short	30 ~ 34.9	3
Short to medium	35 ~ 39.9	
medium	40 ~ 44.9	5
Medium to long	45 ~ 49.9	
long	50 ~ 54.9	7

Time	Candidate X	note
Last year	42 cm	**5**
This year	47 cm	**6**

Candidate X :
Different Notes in Last year and This year

it could be misleading to compare Notes from different year based on the absolute measurement.
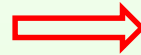
Evaluation of characteristics

(b) to provide appropriate "states of expression" to each variety

✔ Sunshine

✔ temperature

✔ watering

✔ fertilizer

✔ cultivation technic

variety A

variety A

or

variety A

Purpose of Example Variety

(b)   assigning state of expression to each variety

✓ **Actual measurement of QN can be influenced by the environment. (ex. Length, height)**

✓ **Trying to evaluate measured values by absolute measurement, the state of expression (Notes) may change depending on the testing year or testing place.**

✓ **Therefore, in order to be able to evaluate the characteristics stably at any time, it needs to use a relative measurement provided by the Example Varieties.**

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

MS	Leaf blade: length	Example varieties	Note
QN	short	(A)	3
	medium		5
	long	(C)	7

↑
example varieties are provided

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

- **Relative measurement**

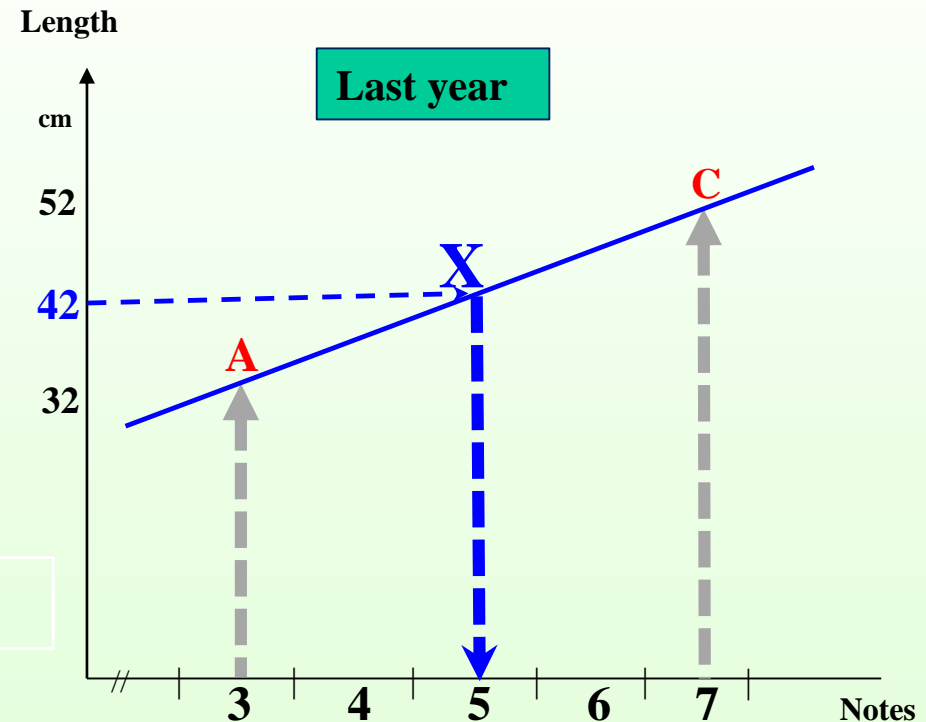| MS	Leaf blade: length	Example varieties	Note	Last year cm
QN	short	A	3	32
	medium		5	
	long	C	7	52
	Candidate X		**?**	**42**

Purpose of Example Variety

What is Example Variety?

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

MS	Leaf blade: length	Example varieties	Note	Last year
QN	short	A	3	32 cm
	medium		5	
	long	C	7	52 cm

Candidate X	5	42 cm

Length

Last year

cm

52

42

32

C

X

A

3 4 5 6 7   Notes

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

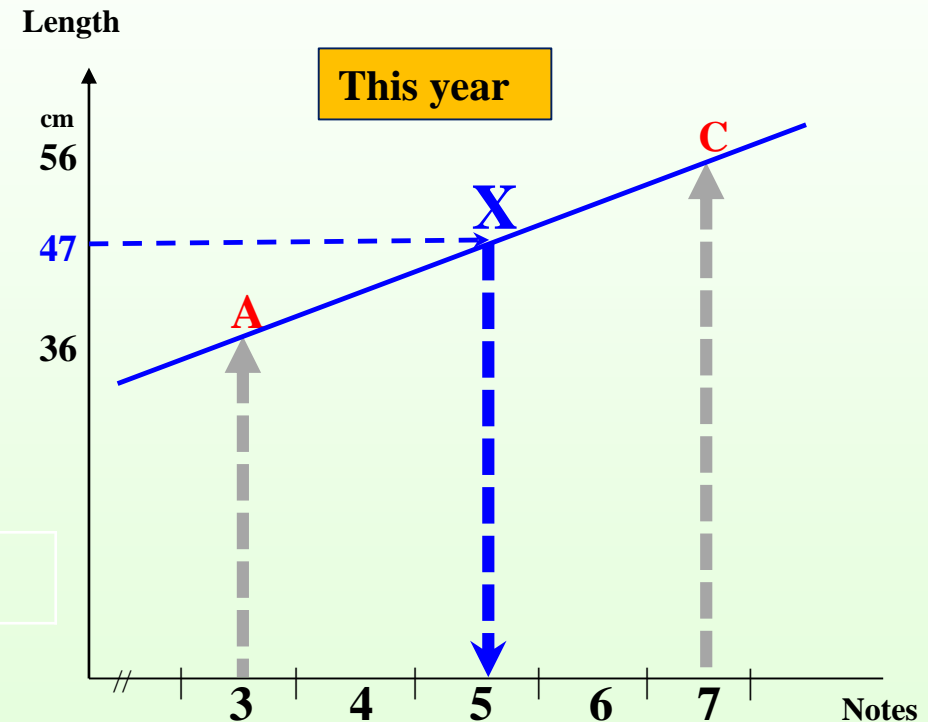| MS	Leaf blade: length	Example varieties	Note	Last year cm	This year cm
QN	short	A	3	32	36
	medium		5		
	long	C	7	52	56
	Candidate X			42 (5)	47 (?)

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

MS	Leaf blade: length	Example varieties	Note	This year
QN	short	A	3	36 cm
	medium		5	
	long	C	7	56 cm

Candidate X	5	47 cm

Length

This year

cm
56

47

X

C

A

36

3   4   5   6   7   Notes

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

MS	Leaf blade: length	Example varieties	Note	Last year cm	This year cm
QN	short	A	3	32	36
	medium		5		
	long	C	7	52	56
	Candidate X			5 42	5 47

Purpose of Example Variety

(b) to provide appropriate "states of expression" to each variety

● **Relative measurement**

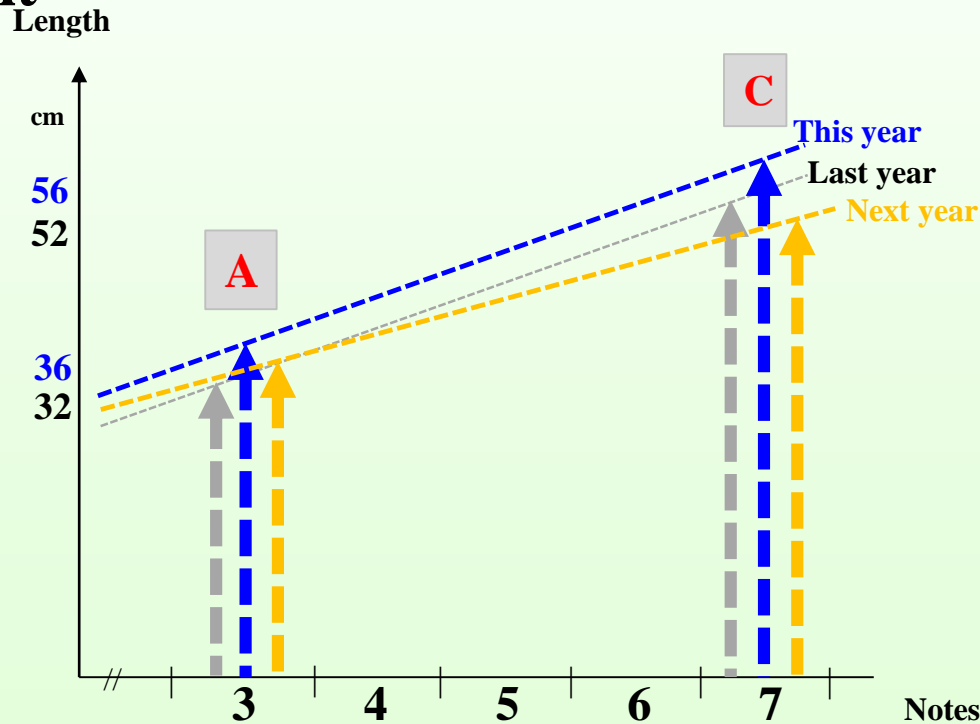|	Example varieties	Last year			This year		
		length	range	Variety X	length	range	Variety X
leaf: length				**42cm**			**47cm**
short (3)	**A**	32	**30 -34**		36	**34 - 38**	
short to medium			**35 -39**			**39 -43**	
medium (5)			**40 -44**	5		**44 - 48**	5
medium to long			**45 - 49**			**49 - 53**	
long (7)	**C**	52	**50 - 54**		56	**54 - 58**	

Purpose of Example Variety

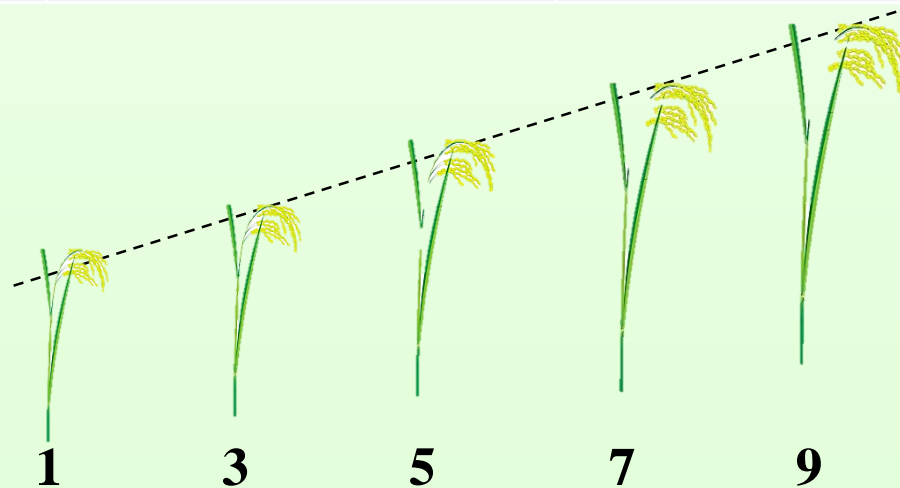**(b) to provide appropriate "states of expression" to each variety**

● **Relative measurement**

Evaluation of characteristics

(b) to provide appropriate "states of expression" to each variety

26 (*)	70 VS	Stem length(excluding panicle)	Example variety	Notes
QN		very short	Lampo, Leda	1
		short	Loto, Thaibonnet	3
		medium	Ariete, Bahia	5
		long	Baldo	7
		very long	Carnaroli	9

1   3   5   7   9

Criteria for Example Variety

- ✓ **Well known material freely available and easily accessible**

- ✓ **All desired states of expression should be covered with the minimum number of example varieties**

- ✓ **Expression must not change significantly with environment**

- ✓ **Should be uniform and stable**

Criteria for Example Variety

What is Example Variety?

A example variety should cover as many example states as possible

new No.	Name of Variety	1 1.(+)VS QN Coleoptile: Anthocyanin coloration	2 2.VS PQ Basal leaf: Sheath color	3 3.VG QN Leaf: Intensity of green color	4 4.VG QL Leaf: Anthocyanin coloration	5 5.VG PQ Leaf: Distribution of anthocyanin coloration	6 6.VG QL Leaf sheath: Anthocyanin coloration	7 7 VG QN Leaf sheath: Intensity of anthocyanin coloration	8 8.VS QN Leaf: Pubescence of blade	10 (*) 9.(*) VS QL Leaf: Anthocyanin coloration of auricles	12 10 VS QL Leaf: Anthocyanin coloration of collar
1	Bắc thơm số 7 ⭕	1	1	5	1		1		3	1	1
14	BM 9962 ❓							3			
5	Hoa khôi 4										
6	Hương việt 3										
7	Khang dân 18 ⭕	1	1		1		1		7	1	1
18	Koshihikari kazusa 2 go										
10	Q5			7					9		

Criteria for Example Variety

■ **Necessity of example varieties**

No need
A characteristic not influenced by the year or environment
(QL characteristics)

Need
A characteristic influenced by the environment

(QN and some PQ characteristics)
- ✓ QN : at least two states of expression should be provided.
- ✓ PQ : to provide a set of example varieties to cover the different types of variation within the range of expression of the characteristics.
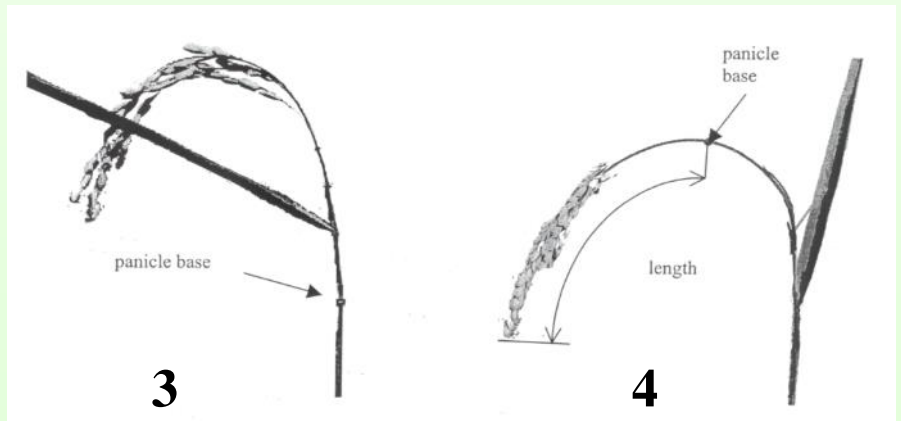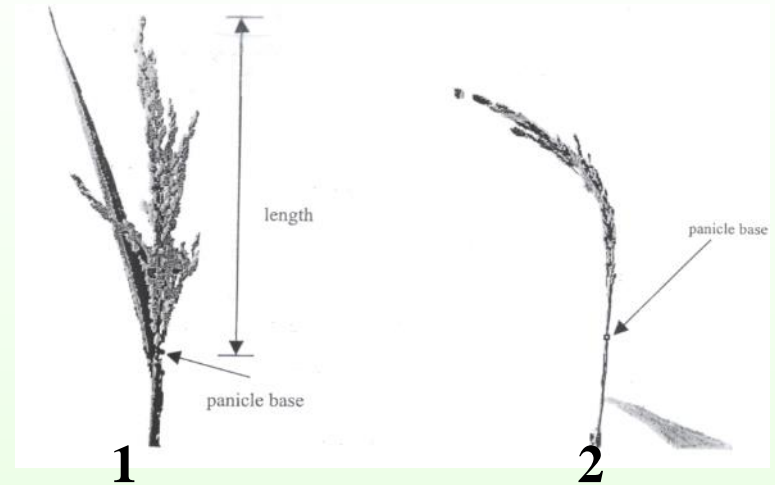
■ How to use Example Varieties

QL, PQ characteristics

Select the most similar expression

QL, PQ characteristics

How to use the example varieties

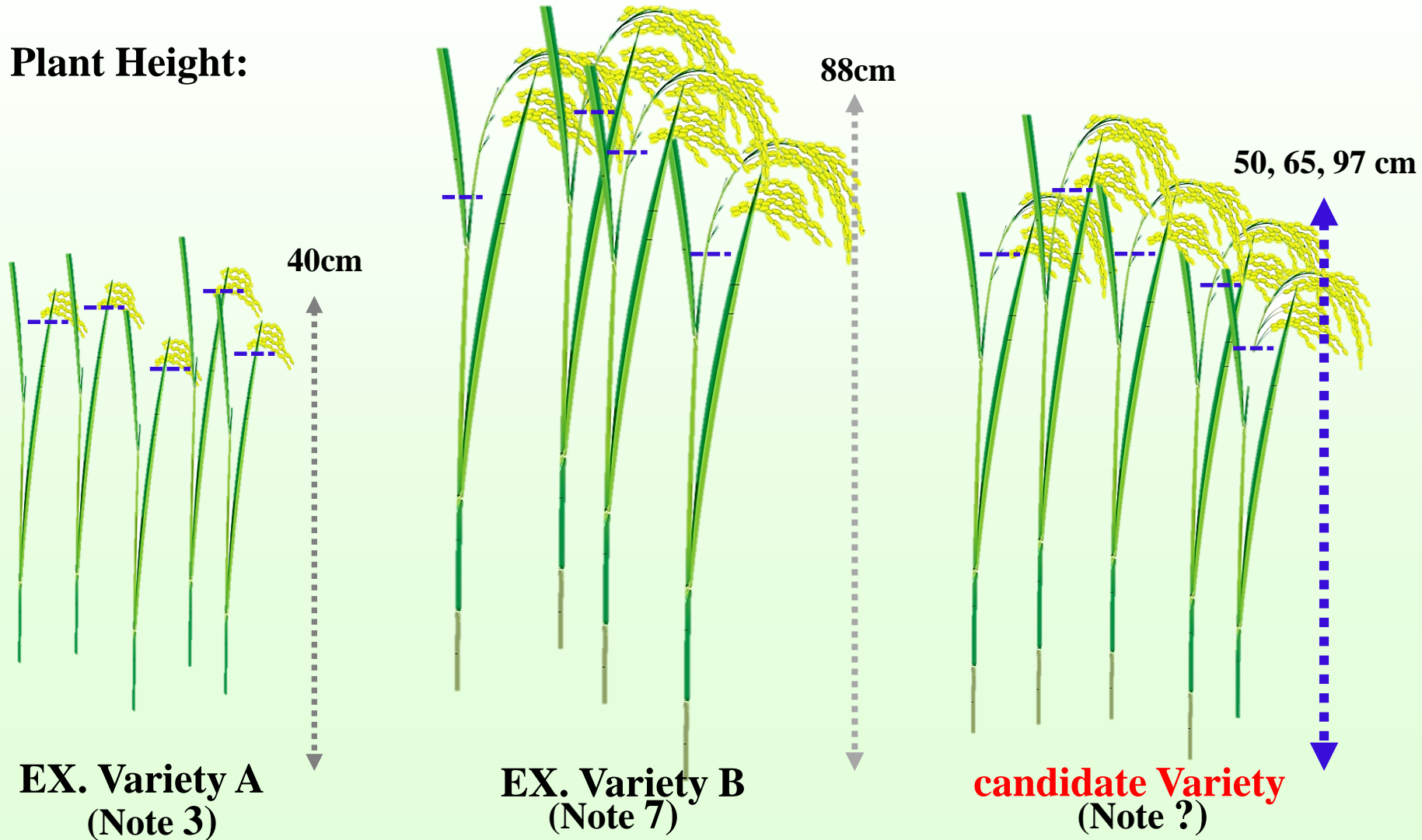
selecting an appropriate type "**Panicle: type of secondary branching**"

QN characteristics

How to use the example varieties

Plant Height:

88cm

40cm

50, 65, 97 cm

EX. Variety A
(Note 3)

EX. Variety B
(Note 7)

candidate Variety
(Note ?)

QN characteristics

■ Converting measurements into notes

variety	height	Notes
A	40cm	3
B	88cm	7
C1	50	4
C2	65	5
C3	97	8
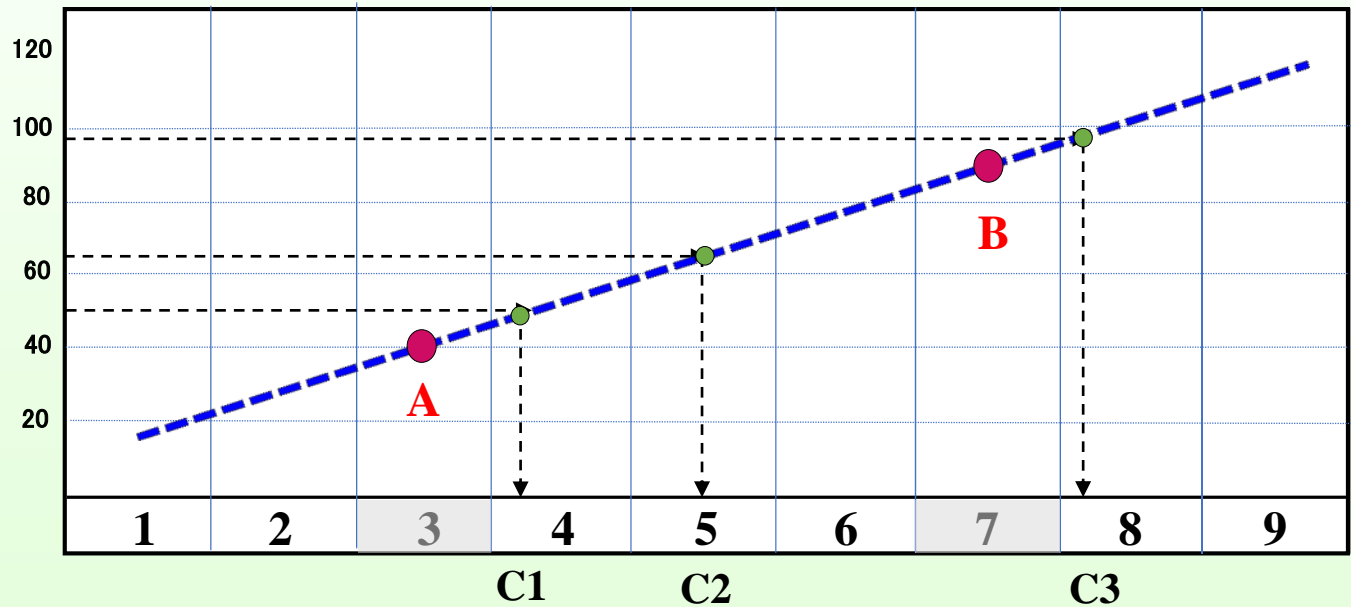
Step for selecting example varieties

■ **Converting measurements into notes**

● how to make a "Note setting table"

    ■ Step1: get an interval value (width of one note)

    ✓ Put "40" → note 3, "88" → note 7,

notes	1	2	3	4	5	6	7	8	9
			40 (A)				**88** (B)		

    ✓ an interval value → (88-40) / 4 = 48/4 = **12**

notes	1	2	3	4	5	6	7	8	9
			40 (A)				**88** (B)		

←12→ ←12→   ←12→

Step for selecting example varieties

- **Step2: get a value of range of each note**

- get a value of range of Note 3.

  "40" is middle value in the range of Note3.

notes	1	2	3	4	5	6	7	8	9
	40-6=34		**40**	34+12=46			**88**		

starting point of Note3 → 40- 12/2 = 40-6 = 34

note setting table

notes	1	2	3	4	5	6	7	8	9
interval	~10	22~	34~	46~	58~	70~	82~	94~	106~

34-12   34+12

Step for selecting example varieties

How to set up Example Varieties

■ Step3: get notes from "note setting table"

note setting table

notes	1	2	3	4	5	6	7	8	9
interval	~10	22~	34~	46~	58~	70~	82~	94~	106~

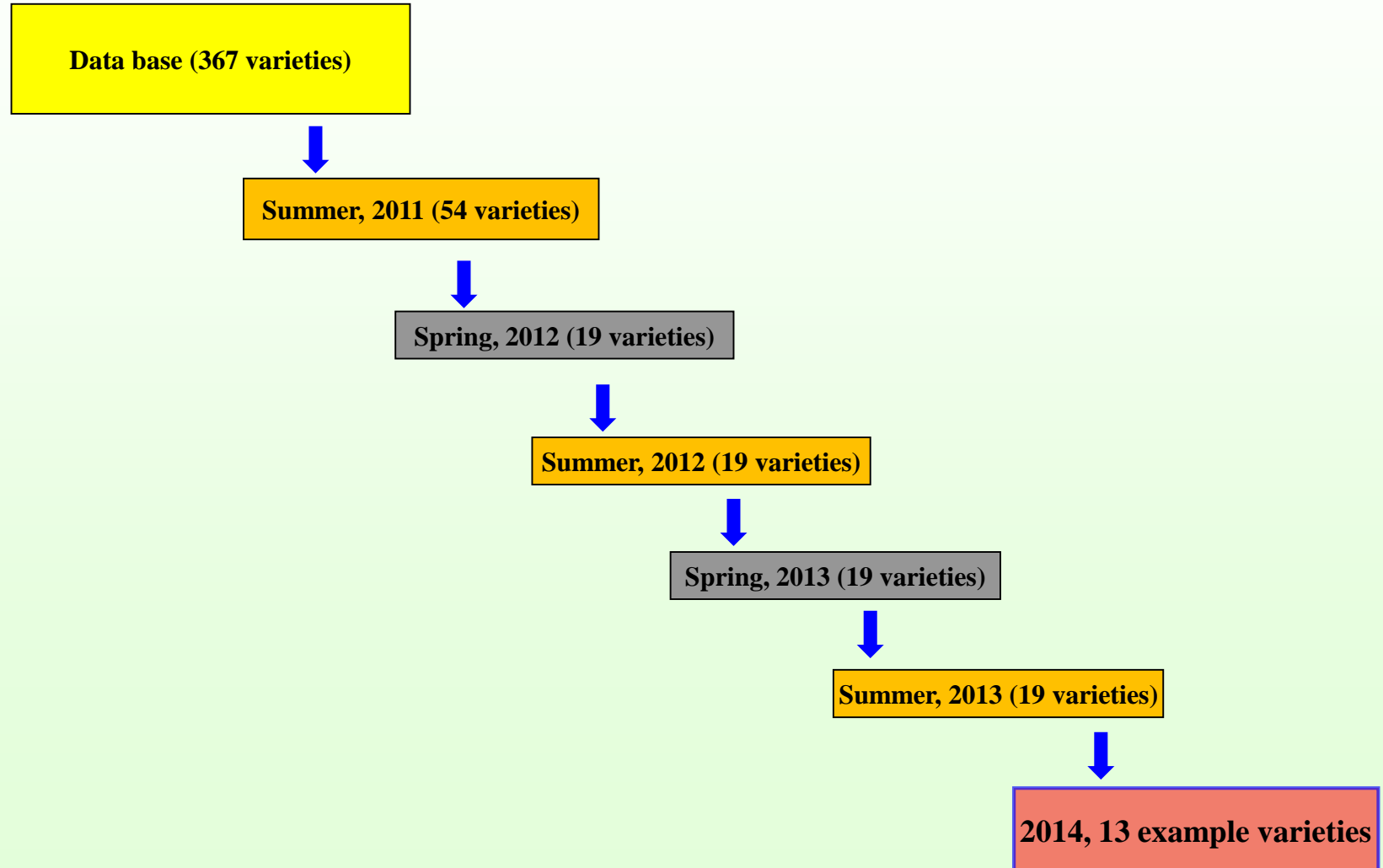| variety	height	Notes
A	40cm	3
B	88cm	7
C1	50	?
C2	65	?
C3	97	?

QN characteristics

■ **Converting measurements into notes**

✓ steps
  – **calculate mean of height of example varieties and candidate variety**
  – **get an interval value (width of one note)**
  – **get a value of range of each note   (make a "note setting table")**
  – **get notes of variety from the "note setting table"**

- How to set up Example Varieties

The process of selection of Example Varieties for Rice in Vietnam

Data base (367 varieties)

↓

Summer, 2011 (54 varieties)

↓

Spring, 2012 (19 varieties)

↓

Summer, 2012 (19 varieties)

↓

Spring, 2013 (19 varieties)

↓

Summer, 2013 (19 varieties)

↓

2014, 13 example varieties

Step for selecting example varieties

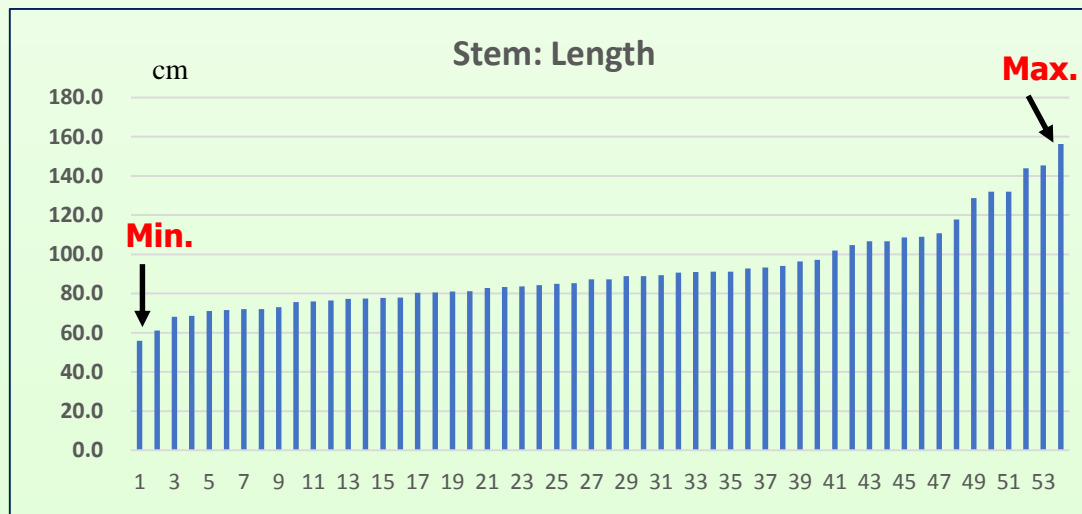How to set up Example Varieties

Example: **plant: length**

- ■ Step1: collecting data
    - ✓ Collect the existing varieties
    - ✓ Measuring "plant: length" of above varieties by Growing test

- ■ Step2: analyzing the data
    - ✓ Sort the data. Find Min. and Max. value from the data.

Step for selecting example varieties

Example: **plant height**

- ■ Step2: analyzing the data
- ✓ Sort the data. Find Max and Min value from the data.

min = 56.0, max = 156.8㎝

1	2	3	4	5	6	7	8	9	10
56.0	61.0	68.2	68.6	71.0	71.5	72.0	72.1	73.0	75.6
11	12	13	14	15	16	17	18	19	20
76.0	76.5	77.2	77.4	77.7	78.0	80.4	80.4	81.0	81.2
21	22	23	24	25	26	27	28	29	30
82.8	83.3	83.6	84.3	85.0	85.3	87.1	87.2	88.9	88.9
31	32	33	34	35	36	37	38	39	40
89.3	90.7	91.0	91.1	91.2	92.7	93.2	94.1	96.4	97.1
41	42	43	44	45	46	47	48	49	50
101.8	104.7	106.6	106.7	108.6	109.0	110.7	117.7	128.7	131.9
51	52	53	54						
132.0	143.9	145.3	156.8						

Step for selecting example varieties

■ Step2: analyzing the data

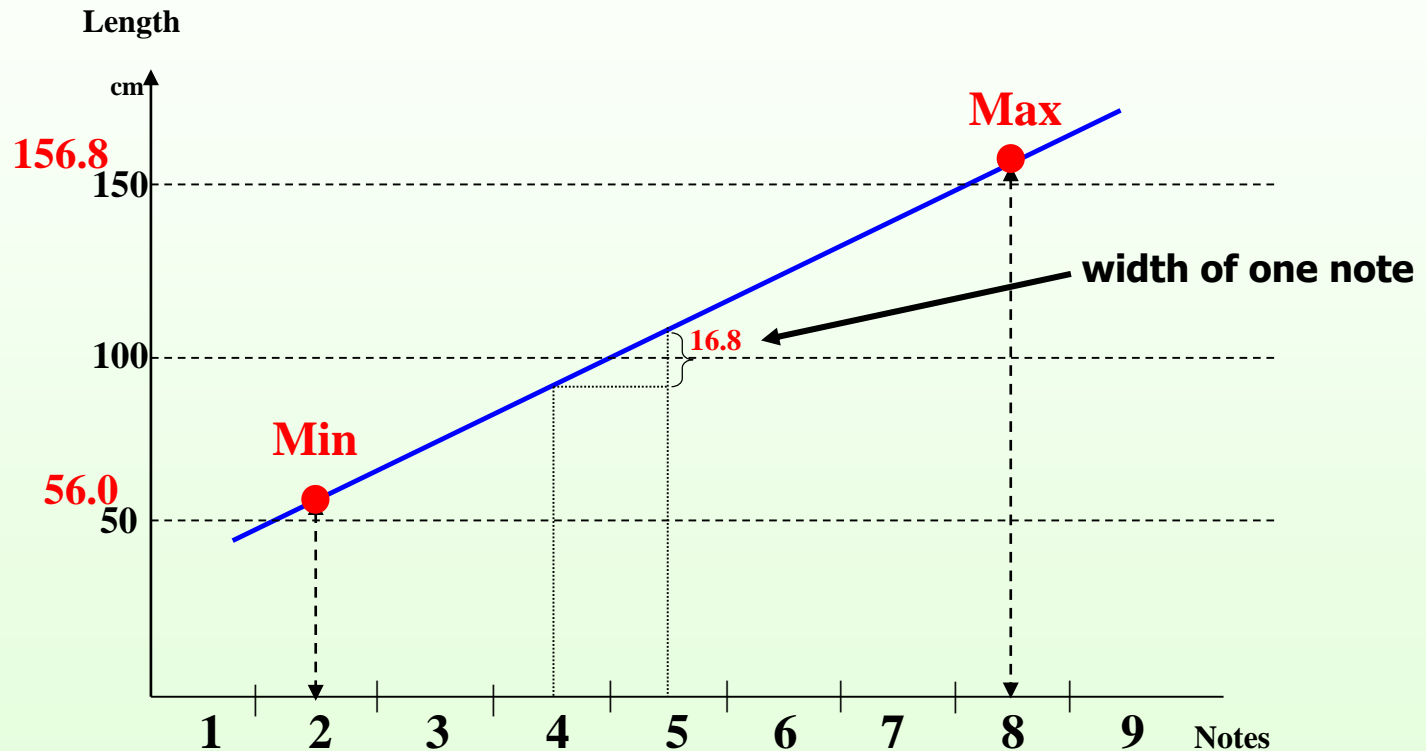✓ Put the Min. value → note 2 (or 3), Max. value → 8 (or 7)

notes	1	2	3	4	5	6	7	8	9
		56.0						156.8	

✓ an interval value → (156.8 -56) / 6 = 100.8 / 6 = 16.8
(width of one note)

notes	1	2	3	4	5	6	7	8	9
		56.0						156.8	

←16.8→   ←16.8→

Step for selecting example varieties

How to set up Example Varieties

Step for selecting example varieties

■ Step2: analyzing the data

✓ get a value of range of Note 2.
  "56.0" is middle value in the range of Note 2.

notes	1	2	3	4	5	6	7	8	9
	56-8.4=47.6	**56.0**	47.6+16.8=64.4					**156.8**	
		8.4 8.4	←16.8→						

starting point of Note 2 → 56.0-8.4=47.6

starting point of Note 3 → 47.6+16.8=64.4

Step for selecting example varieties

How to set up Example Varieties

■ **Step2: analyzing the data**

✓ calculate the range of each note   **[note setting table]**

starting point of Note 2 → 56.0-8.4=47.6
starting point of Note 3 → 47.6+16.8=64.4
starting point of Note 4 → 64.4+16.8=81.2 (the same hereafter)

notes	1	2	3	4	5	6	7	8	9
interval	~47.5	47.6~	64.4~	81.2~	98~	114.8~	131.6~	148.4~	165.2~

47.6+16.8

Step for selecting example varieties

How to set up Example Varieties

■ **Step2: analyzing the data**

Attribute the note to each variety according to **[note setting table]**

1	2	3	4	5	6	7	8	9	10
56.0	61.0	68.2	68.6	71.0	71.5	72.0	72.1	73.0	75.6
02	02	03	03	03	03	03	03	03	03
11	12	13	14	15	16	17	18	19	20
76.0	76.5	77.2	77.4	77.7	78.0	80.4	80.4	81.0	81.2
03	03	03	03	03	03	03	03	03	04
21	22	23	24	25	26	27	28	29	30
82.8	83.3	83.6	84.3	85.0	85.3	87.1	87.2	88.9	88.9
04	04	04	04	04	04	04	04	04	04
31	32	33	34	35	36	37	38	39	40
89.3	90.7	91.0	91.1	91.2	92.7	93.2	94.1	96.4	97.1
04	04	04	04	04	04	04	04	04	04
41	42	43	44	45	46	47	48	49	50
101.8	104.7	106.6	106.7	108.6	109.0	110.7	117.7	128.7	131.9
05	05	05	05	05	05	05	06	06	07
51	52	53	54						
132.0	143.9	145.3	156.8						
07	07	07	08						

■ Example: Stem: length   40 existing Variety

✓ Min: 56.0, Max: 156.8 range(Max – Min): 100.8

✓ Number of notes (08 – 02)= 6

✓ interval values for each note: 16.8 cm

Step for selecting example varieties

How to set up Example Varieties

■ Step3: confirming the data

✓ Confirm the data of each variety by re-examination.

- Make a "note setting table" and get the note to each variety in second year.

✓ Compare both notes of each variety in first year and second year.

✓ Select the varieties with stable Notes for both first year and second year

✓ Finally select a representative variety for each note as example variety.

Step for selecting example varieties

How to set up Example Varieties

Table of Example varieties and notes (only QN characteristics)

|	Leaf blade: Length	Leaf blade: Width	Time of heading (50% of plants with heads)	Stem: Thickness	Non-prostrate varieties only: Stem length (excluding panicle)	Panicle: Length of main axis	Panicle: Number per plant	Time of maturity	Grain: Weight of 1000 fully developed grains	Grain: Length	Grain: Width	Decorticated grain: Length	Decorticated grain: Width
BM 9962					7	7							
ĐTL2							3						
Hoa khôi 4		5										5	
Hương việt 3				5									3
Khang dân 18									3		3		
Koshihikari kazusa 2 go			3	3	3	3	5	3		3		3	7
NTL1	6		5					5	8				
NV1											7		
P6 đột biến		3											
Q5	4												
ST7										7			

Step for selecting example varieties

	Vietnamese	English	Japanese	Gi ai đo ạn	M ã số	Example varieties
26 **Q** **N** **VS**	**Thân: Chiều dài (trừ bông). Chỉ với giống không bò lan**	**Stem: length (excuding panicle). Non-prostrate verieties only**	稈：長さ（穂を除く、浮稲を除く）	70		
	Rất thấp	very short	極短		1	
	Thấp	short	短		3	Koshihikari kazusa 2 go
	Trung bình	medium	中		5	
	Cao	long	長		7	BM9962
	Rất cao	very long	**極長**		9	

panicle base

Step for selecting example varieties

How to set up Example Varieties

- How to allocate the Notes
    - whether the sample size is enough
    - whether the range of variation of the sample is large or small
    - The interval value is enough for distinguishing varieties?
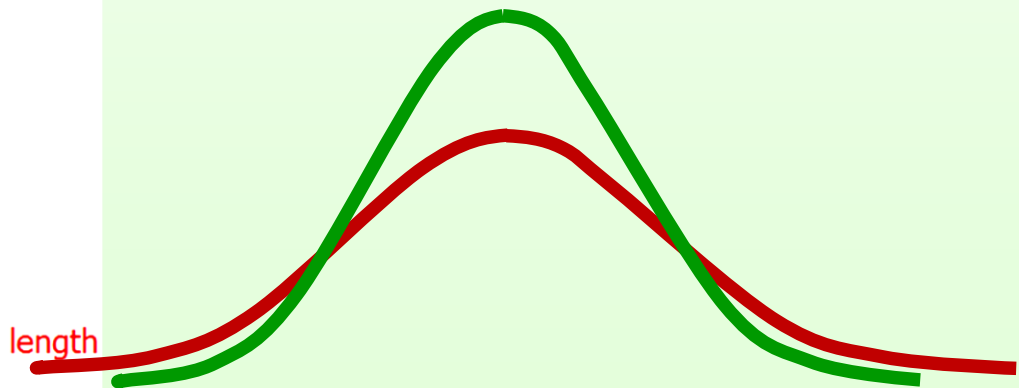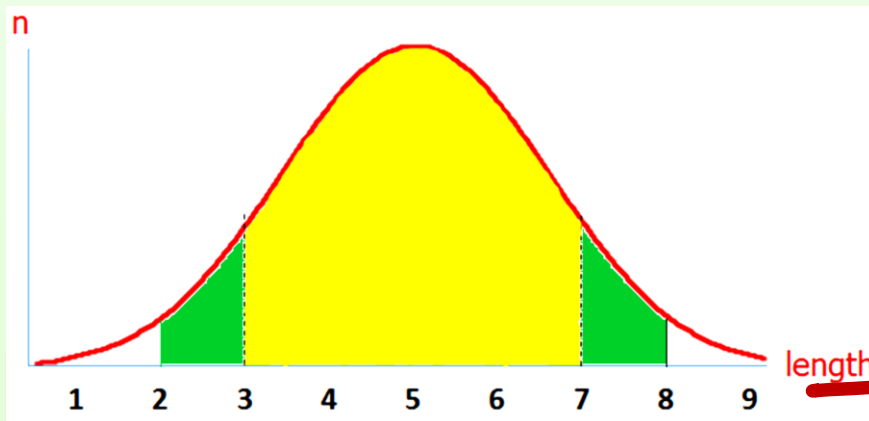
Thank you
for your attention

Email: tadao.mizuno@gmail.com