

INSTRUCTION MANUAL OF DUS TEST FOR CORN



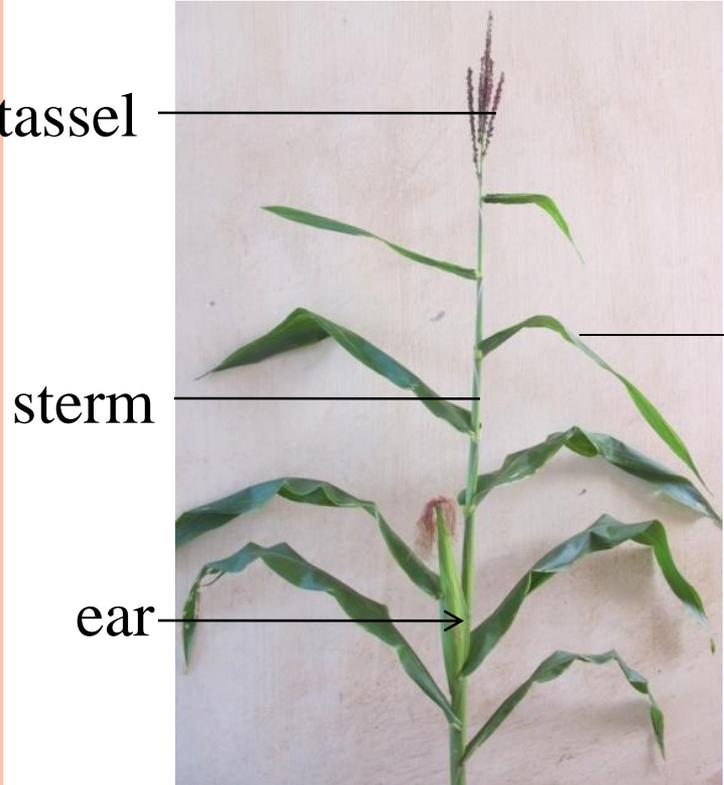
Vung Tau, August, 1st -4th, 2016

Msc. Nguyen Thi Mai Ha

Decimal Code for the Growth Stages of corn

Code	General Description	Code	General Description
	<u>Seedling growth</u>	69	Anthesis complete
14	4 leaves unfolded		Milk development
	<u>Tillering</u>	71	Caryopsis watery ripe
	Stem elongation	73	Early milk
	Booting	75	Medium milk
	Inflorescence emergence	79 (1)	Grains have reached final size
51 (♀♂)	Inflorescence just visible	85	Dough development soft dough
59	Emergence of inflorescence completed		Ripening
(♀♂)	Anthesis	92	Caryopsis hard (can no longer be dented by thumbnail)
61	Beginning of anthesis		
65	Anthesis halfway	93	Caryopsis loosening in daytime

Morphology of corn



main axis
glum
Base of glum



leaf



internode

sheath



brace roots

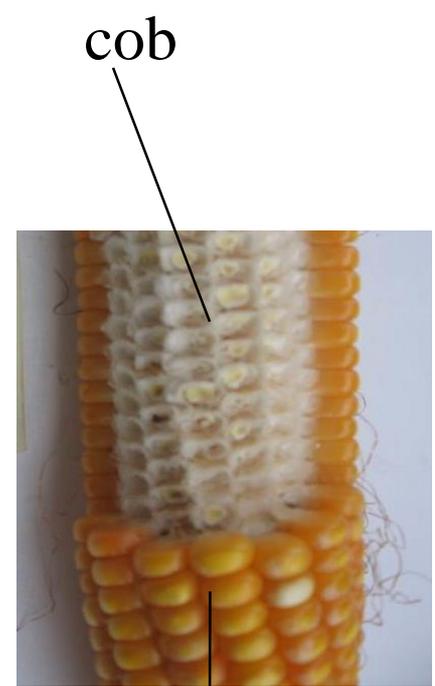




silk



peduncle



cob

grain



	Vietnamese	English	Stage	Note	Example varieties
1	Lá thứ nhất: sắc tố antoxian của bẹ	First leaf: anthocyanin coloration of sheath	14		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	
	Trung bình	medium		5	
	Đậm	strong		7	B21, LVN10
	Rất đậm	very strong		9	LVN45

1. Stage of evaluation: 4 leaves unfolded
2. Position of evaluation: Sheath of first true leaf
3. Method of evaluation: : Visible group



	Vietnamese	English	Stage	Note	Example varieties
2	Lá thứ nhất: hình dạng phần đỉnh	first leaf: shape of tip	14		
PQ	Nhọn	pointed		1	
VG	Nhọn đến tròn	pointed to rounded		2	
	Tròn	rounded		3	LVN10, AG69, B21
	Tròn đến hình thìa	rounded to spatulate		4	LVN45
	Hình thìa	spatulate		5	

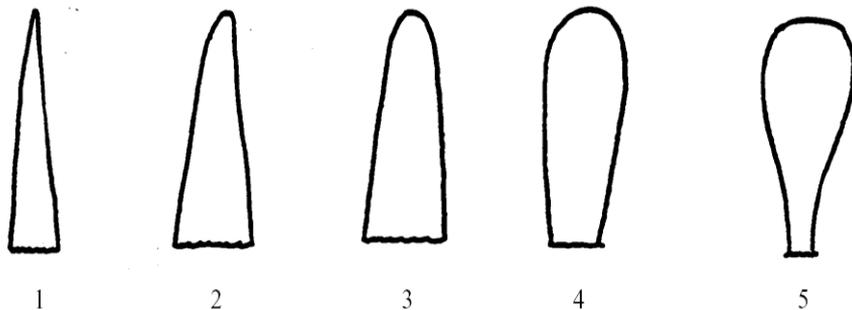
1. Stage of evaluation :

4 leaves unfolded

2. Position of valuation:

1/3 of the first true leaf from the top

3. Method of evaluation: Visible group



	Vietnamese	English	Stage	Note	Example varieties
3	Bộ lá: mức độ xanh	Foliage: intensity of green color	51-59		
QN	Nhạt	light		1	Fancy Purple111
VG	Trung bình	medium		2	Wax 44
	Đậm	dark		3	Sugar 75

1. Stage of evaluation :

From inflorescence just visible to emergence of inflorescence completed

2. Position of evaluation:

Leaf on the middle part of plant

3. Method of evaluation:

Visible group



	Vietnamese	English	Stage	Note	Example varieties
4	Lá: sự gợn sóng của mép	Leaf: undulation of margin of blade	51-59		
QN	Không có hoặc rất ít	absent or very weak		1	
VG	Trung bình	intermediate		2	Fancy Purple111
	Nhiều	strong		3	Tím VS10

1. Stage of evaluation :

From inflorescence just visible to emergence of inflorescence completed

2. Position of evaluation:

Margin of leaf blade on the middle part of plant

3. Method of evaluation: Visible group



1



2

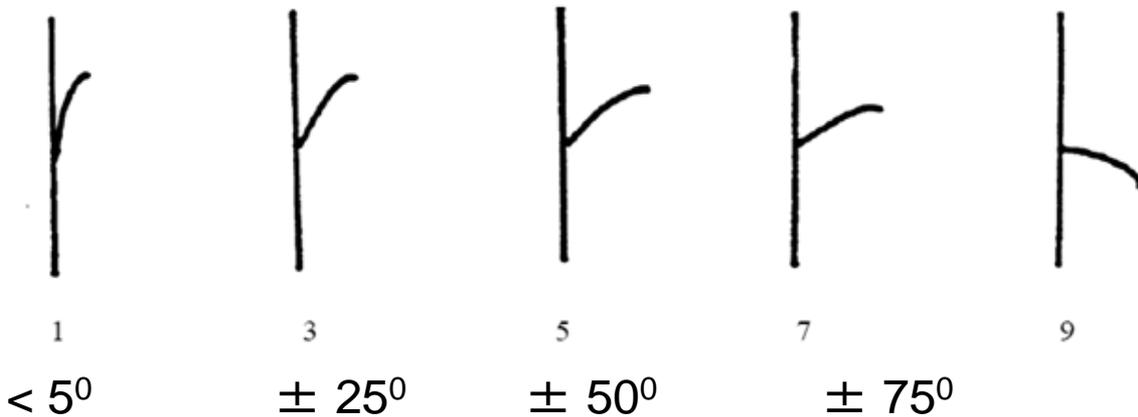


3



	Vietnamese	English	Stage	Note	Example varieties
5	Lá: góc giữa phiến lá và thân	Leaf: angle between blade and stem	65-69		
QN	Rất hẹp	very small		1	
VG	Hẹp	small		3	Tím VS10
	Trung bình	medium		5	Wax 44
	Rộng	large		7	
	Rất rộng	very large		9	

1. Stage of evaluation :
50% of flowering plants
2. Position of evaluation:
Leaf above of the top of ear
3. Method of evaluation: Visible group



	Vietnamese	English	Stage	Note	Example varieties
6	Lá: thể phiến lá	Leaf: attitude of blade	65-69		
QL	Thẳng	absent or very slightly recurved		1	
VG	Hơi cong	slightly recurved		3	HK4, B21
	Cong	moderately recurved		5	Wax 44, LVN10
	Khá cong	strongly recurved		7	
	Rất cong	very strongly recurved		9	

1. Stage of evaluation :
50% of flowering plants
2. Position of evaluation:
Leaf above of the top of ear
3. Method of evaluation: Visible group



	Vietnamese	English	Stage	Note	Example varieties
7	Thân: mức độ dích dắc	Stem: degree of zig-zag	65-69		
QN	Không có hoặc rất ít	absent or very slight		1	
VG	Ít	slight		2	Fancy Purple 111
	Nhiều	strong		3	

1. Stage of evaluation :
50% of flowering plants
2. Position of evaluation:
Apart of middle plant
3. Method of evaluation:
Visible group



	Vietnamese	English	Stage	Note	Example varieties
8	Cờ: thời gian trỗ	Tassel: time of anthesis	65-69		
QN	Rất sớm	very early		1	
MG	Sớm	early		3	
	Trung bình	medium		5	Tím VS10
	Muộn	late		7	
	Rất muộn	very late		9	

1. stage of evaluation:
50% of flowering plants
in the middle part of the the main axis
2. Position of evaluation:
Middle part of the main axis
3. Method of evaluation:
Measurement of group



	Vietnamese	English	Stage	Note	Example varieties
9	Cờ: sắc tố antoxian ở chân đế mày	Tassel: anthocyanin coloration at base of glum	65-69		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	B21
	Trung bình	medium		5	Wax 44
	Đậm	strong		7	LVN45
	Rất đậm	very strong		9	Fancy Purple 111

1. Stage of evaluation: 50% of flowering plants
2. Position of evaluation:
Base of glum in the middle part of main axis
3. Method of evaluation: Visible group



1



3



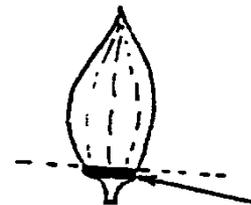
5



7



9



Base glum



	Vietnamese	English	Stage	Note	Example varieties
10	Cờ: sắc tố antoxian ở mày	Tassel: anthocyanin coloration at base of glum	65-69		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	B21
	Trung bình	medium		5	Wax 44
	Đậm	strong		7	LVN45
	Rất đậm	very strong		9	Fancy Purple 111

1. Stage of evaluation:
2. Position of evaluation:
3. Method of evaluation:

50% of flowering plants

Glum in the middle part of main axis

Visible group



1



3



5



7



9



	Vietnamese	English	Stage	Note	Example varieties
11	Cờ: sắc tố antoxian của bao phấn, trên bao phấn tươi	Tassel: anthocyanin coloration of anthers on fresh anthers	65-69		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	B21
	Trung bình	medium		5	Wax 44
	Đậm	strong		7	LVN45
	Rất đậm	very strong		9	Fancy Purple 111

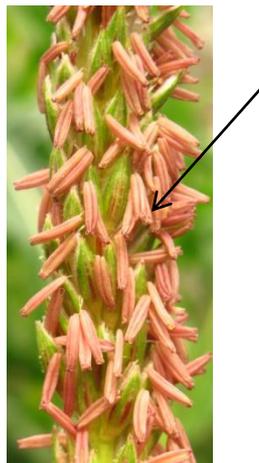
1. Stage of evaluation: 50% of flowering plants
2. Position of evaluation: Anther in the middle part of main axis
3. Method of evaluation: Visible group



1



3



5



7



9



	Vietnamese	English	Stage	Note	Example varieties
12	Cờ: mật độ của hoa	Tassel: density of spikelets	65-69		
QN	Thưa	sparse		3	C919, LVN10
VG	Trung bình	medium		5	Tím VS10
	Dày	dense		7	

1. Stage of evaluation :
50% of flowering plants
2. Position of evaluation:
Flower in the middle main axis
3. Method of evaluation:
Visible group



3



5

	Vietnamese	English	Stage	Note	Example varieties
13	Cờ: góc giữa trục chính và nhánh bên	Tassel: angle between main axis and lateral branches	69		
QN	Rất hẹp	very small ($<5^{\circ}$)		1	
VG	Hẹp	small ($\pm 25^{\circ}$)		3	Sugar 75
	Trung bình	medium ($\pm 50^{\circ}$)		5	Fancy Purple 111
	Rộng	Large ($\pm 75^{\circ}$)		7	
	Rất rộng	very large ($<90^{\circ}$)		9	

1. Stage of evaluation :

50% of flowering plants

2. Position of evaluation:

Angle between main axis and lateral branches in 1/3 below of tassel

3. Method of evaluation:

Visible group



1



3



5



7



9



	Vietnamese	English	Stage	Note	Example varieties
14	Cờ: thế của nhánh bên	Tassel: attitude of lateral branches	65-75		
QN	Thẳng	absent or very slightly recurved		1	
VG	Hơi cong	slightly recurved		3	Sugar 75, C919
	Cong	moderately recurved		5	HK4
	Khá cong	strong recurved		7	
	Rất cong	very strong recurved		9	

1. Stage of evaluation: 50% of flowering plants

2. Position of evaluation: Lateral branches in 1/3 below of tassel

3. Method of evaluation: Visible group



1



3



5



7



9



	Vietnamese	English	Stage	Note	Example varieties
15	Cờ: số nhánh cấp 1	Tassel: number of primary lateral branches	69-75		
QN	Không có hoặc rất ít	absent or very few		1	
MS/VG	Ít	few		3	Sugar 75
	Trung bình	medium		5	Wax 44
	Nhiều	many		7	
	Rất nhiều	very many		9	

1. Stage of evaluation :
50% of flowering plants
2. Position of evaluation:
Primary lateral branches
3. Method of evaluation:
Measure single or visible group



	Vietnamese	English	Stage	Note	Example varieties
16	Bấp: thời gian phun râu	Ear: time of silk emergence			
QN	Rất sớm	very early		1	
MG	Sớm	early		3	
	Trung bình	medium		5	VS10
	Muộn	late		7	
	Rất muộn	very late		9	

1. Stage of Evaluation :
50% plants silk emergence
2. Position of Evaluation:
Silk of the top ear
3. Method of Evaluation:
Measure group



	Vietnamese	English	Stage	Note	Example varieties
17	Bấp: sắc tố antoxian của râu	Ear: anthocyanin coloration of silk	65-75		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	NT6619
	Trung bình	medium		5	Wax 44
	Đậm	strong		7	CP333, CP989
	Rất đậm	very strong		9	

1. Stage of Evaluation :

2. Position of Evaluation:

3. Method of Evaluation:

50% plants silk emergence

Silk of the top ear

Measure group



1



3



5



7



9

	Vietnamese	English	Stage	Note	Example varieties
18	Thân: sắc tố antoxian ở rễ chân kiềng	Stem: anthocyanin coloration of brace roots	65-75		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75, AG69
VG	Nhạt	weak		3	Wax 44
	Trung bình	medium		5	
	Đậm	strong		7	Tím VS10
	Rất Đậm	very strong		9	

1. Stage of evaluation :
2. Position of evaluation:
3. Method of evaluation:

50% brace roots of plant appear

Brace roots

Visible up



1



3



5



7

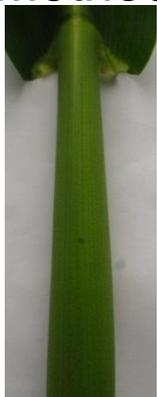


9

	Vietnamese	English	Stage	Note	Example varieties
19	Lá: sắc tố antoxian của bẹ	Leaf: anthocyanin coloration of sheath	71-75		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	
	Trung bình	medium		5	
	Đậm	strong		7	TLP6868
	Rất Đậm	very strong		9	Fancy Purple 111

1. Stage of evaluation :
2. Position of evaluation:
3. Method of evaluation:

From early milk to medium milk
Sheath of leaf
Visible group



1



3



5



7



9

	Vietnamese	English	Stage	Note	Example varieties
20	Thân: sắc tố antoxian của lóng	Stem: anthocyanin coloration of internodes	71-75		
QN	Không có hoặc rất nhạt	absent or very weak		1	Sugar 75
VG	Nhạt	weak		3	
	Trung bình	medium		5	
	Đậm	strong		7	TLP6868
	Rất Đậm	very strong		9	Fancy Purple 111

1. Stage of evaluation: From early milk to medium milk
2. Position of evaluation: Internodes above of the top of ear
3. Method of evaluation: Visible group



1



3



5



7



9



	Vietnamese	English	Stage	Note	Example varieties
21	Cờ: chiều dài trục chính từ nhánh thấp nhất	Tassel: length of main axis above lowest side branch	71-75		
QN	Rất ngắn	very short		1	
MS	Ngắn	short		3	Wax 44
	Trung bình	medium		5	Fancy Purple 111
	Dài	long		7	
	Rất dài	very long		9	

1. Stage of evaluation :

From early milk to medium milk

2. Position of evaluation:

Main axis

3. Method of evaluation:

Measure single



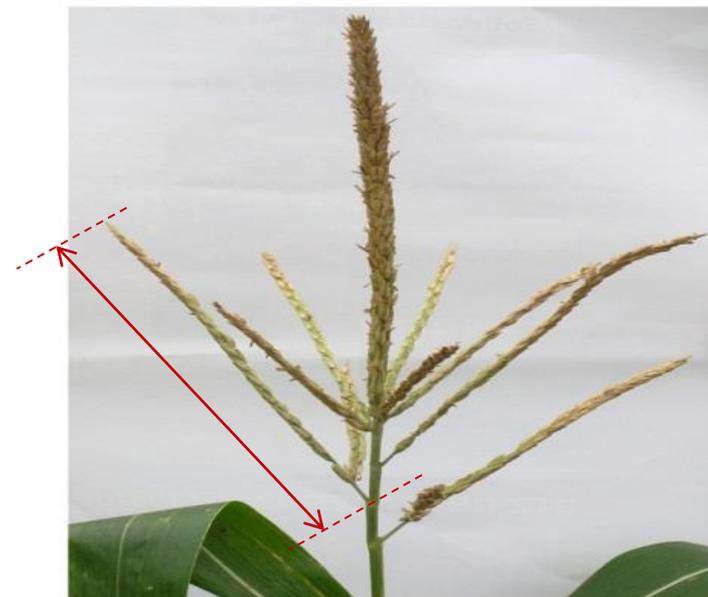
	Vietnamese	English	Stage	Note	Example varieties
22	Cờ: chiều dài trục chính từ nhánh cao nhất	Tassel: length of main axis above upper side branch	71-75		
QN	Rất ngắn	very short		1	
MS	Ngắn	short		3	Wax 44
	Trung bình	medium		5	CP989
	Dài	long		7	
	Rất dài	very long		9	

1. Stage of evaluation :
From early milk to medium milk
2. Position of evaluation:
Main axis
3. Method of evaluation:
Measure single



	Vietnamese	English	Stage	Note	Example varieties
23	Cờ: chiều dài nhánh bên	Tassel: length of side branch	71-75		
QN	Rất ngắn	very short		1	
MS	Ngắn	short		3	Wax 44
	Trung bình	medium		5	CP989
	Dài	long		7	
	Rất dài	very long		9	

1. Stage of evaluation :
From early milk to medium milk
2. Position of evaluation:
The second of primary side branch
3. Method of evaluation:
Measure single



	Vietnamese	English	Stage	Note	Example varieties
24	Cây: chiều cao	Plant: length	75-85		
QN	Rất thấp	very short		1	
MS	Thấp	short		3	
	Trung bình	medium		5	Tím VS10
	Cao	long		7	AG69
	Rất cao	very long		9	

1. Stage of evaluation:
From medium milk
to dough development soft dough
2. Position of Evaluation:
Stem
3. Method of Evaluation:
Measure single



	Vietnamese	English	Stage	Note	Example varieties
25	Cây: tỷ lệ chiều cao đóng bắp trên cùng so với chiều cao cây	Plant: ratio height of insertion of upper ear to plant length	75-85		
QN	Rất thấp	very short		1	
MG	Thấp	short		3	AG69
	Trung bình	medium		5	LVN10
	Cao	long		7	
	Rất cao	very long		9	

- 1. Stage of evaluation:
From medium milk to dough development soft dough
- 2. Position of Evaluation:
Stem
- 3. Method of Evaluation:
Measure group



	Vietnamese	English	Stage	Note	Example varieties
26	Lá: chiều rộng phiến	Leaf: width of blade	75-85		
QN	Rất hẹp	very narrow		1	
MS	Hẹp	narrow		3	
	Trung bình	medium		5	Wax 44
	Rộng	wide		7	
	Rất rộng	very wide		9	

1. Stage of evaluation:
From medium milk
to dough development soft dough
2. Position of Evaluation:
Leaf blade upper ear
3. Method of Evaluation:
Measure single

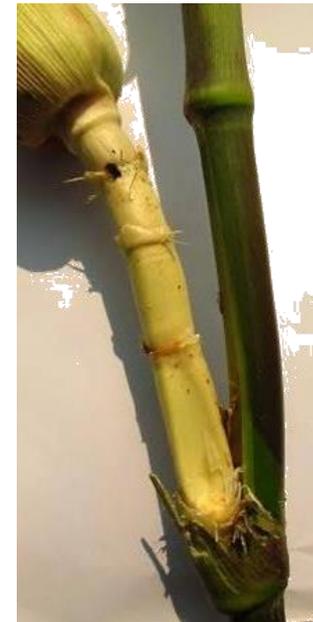


	Vietnamese	English	Stage	Note	Example varieties
27	Bắp: chiều dài cuống	Ear: length of peduncle	75-85		
QN	Rất ngắn	very short		1	
VG	Ngắn	short		3	Fancy Purple 111
	Trung bình	medium		5	LVN45
	Dài	long		7	
	Rất dài	very long		9	

1. Stage of evaluation :
From medium milk to dough development soft dough
2. Position of evaluation:
Peduncle of the top ear
3. Method of evaluation:
Visible group



3



5



	Vietnamese	English	Stage	Note	Example varieties
28	Bấp: chiều dài	Ear: length	92-93		
QN	Rất ngắn	very short		1	
MS	Ngắn	short		3	
	Trung bình	medium		5	Tims VS10
	Dài	long		7	
	Rất dài	very long		9	

1. Stage of evaluation :

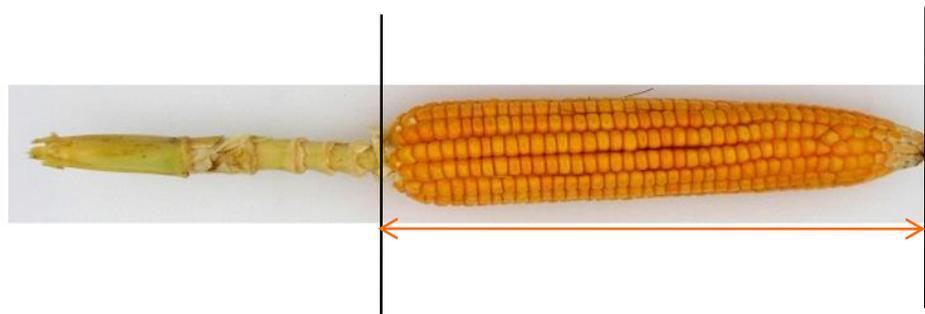
Repening (from medium milk to grain have reached final size for sweet corn 75-79)

2. Position of evaluation:

Upper ear

3. Method of evaluation:

Measure single



	Vietnamese	English	Stage	Note	Example varieties
29	Bấp: đường kính	Ear: diameter	92-93		
QN	Rất nhỏ	very small		1	
MS	Nhỏ	small		3	
	Trung bình	medium		5	
	To	large		7	
	Rất to	very large		9	

1. Stage of evaluation :

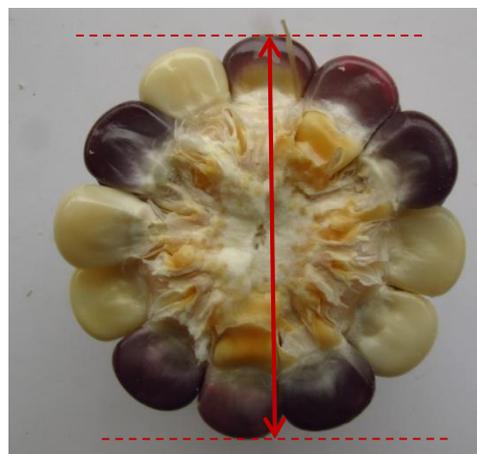
Repening (from medium milk to grain have reached final size for sweet corn 75-79)

2. Position of evaluation:

Upper ear

3. Method of evaluation:

Measure single



	Vietnamese	English	Stage	Note	Example varieties
30	Bắp: đường kính	Ear: diameter	92-93		
QN	Hình nón	conical		1	
MS	Hình nón trụ	conico-cylindrical		3	Fancy Purple 111
	Trụ	cylindrical		5	

1. Stage of evaluation :

Repening (from medium milk to grain have reached final size for sweet corn 75-79)

2. Position of evaluation:

Upper ear

3. Method of evaluation:

Visible group



1



2



3

	Vietnamese	English	Stage	Note	Example varieties
31	Bấp: số hàng hạt	Ear: number of rows of grain	92-93		
QN	Rất ít	very few		1	
MS	Ít	few		3	
	Trung bình	medium		5	HK4
	Nhiều	many		7	
	Rất nhiều	very many		9	

1. Stage of evaluation :
Repening (from medium milk to grain have reached final size for sweet corn 75-79)
2. Position of evaluation:
Upper ear
3. Method of evaluation:
measure single



	Vietnamese	English	Stage	Note	Example varieties
32	Bấp: số màu sắc của hạt. Đối với giống ngô đường	Ear: number of color of grains. Sweetcorn varieties only	75-79		
QL	Một màu	one		1	Sugar 75
VG	Nhiều màu	more than one		2	

1. Stage of evaluation :

From medium milk to grain have reached final size

2. Position of evaluation:

Grain on the middle part of the upper ear

3. Method of evaluation:

Visible group



	Vietnamese	English	Stage	Note	Example varieties
33	Hạt: mức độ màu vàng. Đối với giống ngô đường	Grain: intensity of yellow color. Sweetcorn varieties only	75-79		
QN	Nhạt	light		1	
VG	Trung bình	medium		3	
	Đậm	dark		5	Sugar 75

1. Stage of evaluation :

From medium milk to grain have reached final size

2. Position of evaluation:

Grain on the middle part of the upper ear

3. Method of evaluation:

Visible group



	Vietnamese	English	Stage	Note	Example varieties
34	Hạt: chiều dài (đối với giống ngô đường)	Grain: length (sweetcorn varieties only)	75-79		
QN	Ngắn	short		3	
MS	Trung bình	medium		5	Sugar 75
	Dài	long		7	

1. Stage of evaluation :

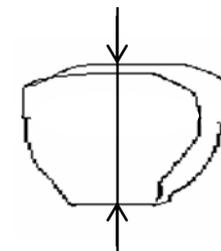
From medium milk to grain have reached final size

2. Position of evaluation:

Grain on the middle part of the upper ear

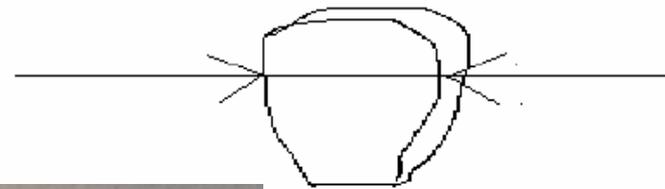
3. Method of evaluation:

Measure single



	Vietnamese	English	Stage	Note	Example varieties
35	Hạt: chiều rộng (đối với giống ngô đường)	Grain: width (sweetcorn varieties only)	75-79		
QN	Hẹp	narrow		3	
MS	Trung bình	medium		5	Sugar 75
	Rộng	broad		7	

1. Stage of evaluation :
From medium milk to grain have reached final
2. Position of evaluation:
Grain on the middle part
of the upper ear
3. Method of evaluation:
Measure single



	Vietnamese	English	Stage	Note	Example varieties
36	Bắp: dạng hạt	Ear: type of grain	92		
QL	Đá	flint		1	LVN45
VG	Bán đá	flint-like		2	NT6619
	Bán răng ngựa	intermediate		3	HK4
	Răng ngựa	dent-like		4	
	Ngô đường	sweet		5	Sugar 75
	Ngô nổ	pop		6	
	Ngô nếp	waxy		7	Fancy Purple 111
	Ngô bột	flour		8	

1. Stage of evaluation :

Repening

2. Position of evaluation:

Grain on the middle part of the upper ear

3. Method of evaluation:

Visible group





1



2



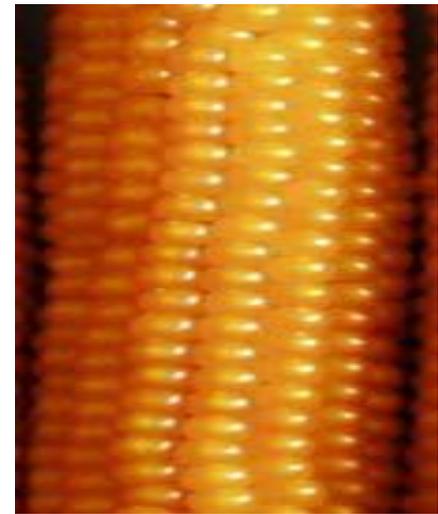
3



4



5



6



	Vietnamese	English	Stage	Note	Example varieties
37	Bắp: sự co ở đỉnh hạt. (đối với giống ngô đường)	Ear: shrinkage of top of grain (sweetcorn varieties only)	92		
QN	Ít	weak		1	
VG	Trung bình	medium		3	
	Nhiều	strong		5	Sugar 75

1. Stage of evaluation: Repeping
2. Position of evaluation: Grain on the middle part of the upper ear
3. Method of evaluation: Measure single



1



3



5

	Vietnamese	English	Stage	Note	Example varieties
38	Dạng hạt nổ (đối với giống ngô nổ)	Type of popped grain (popcorn varieties only)	93		
QL	Hình cánh bướm	butterfly		1	
VG	Hình trung gian	intermediate		2	
	Hình cầu	globular		3	

1. Stage of evaluation :
Repening
2. Position of evaluation:
Popped grain
3. Method of evaluation:
Visible group



1



3

	Vietnamese	English	Stage	Note	Example varieties
39	Bắp: màu chính của đỉnh hạt	Ear: main color of top of grain	92-93		
PQ	Trắng	white		1	HN88
VG	Trắng hơi vàng	yellowish white		2	Wax 44
	Vàng	yellow		3	HK4
	Vàng da cam	yellow orange		4	LVN45
	Da cam	orange		5	AG69
	Đỏ	red		6	
	Tím	purple		7	Fancy Purple 111

1. Stage of evaluation : Repeping
2. Position of evaluation: Grain on the middle part of the upper ear
3. Method of evaluation: Visible group



1



2



3



4



5

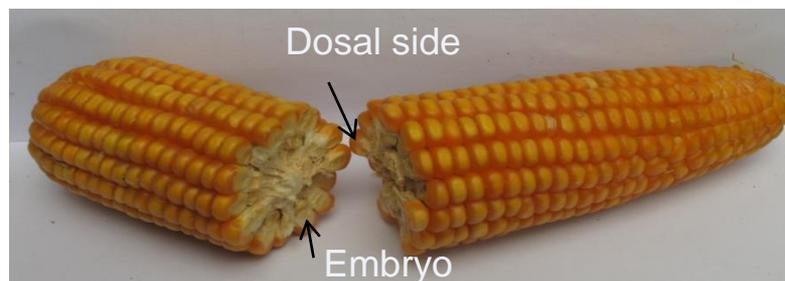


7



	Vietnamese	English	Stage	Note	Example varieties
40	Bắp: màu chính của lưng hạt (trừ các giống ngô đường)	Ear: main color of dorsal side of grain (excluding sweet corn varieties)	93		
PQ	Trắng	white		1	HN88
VG	Trắng hơi vàng	yellowish white		2	Wax 44
	Vàng	yellow		3	
	Vàng da cam	yellow orange		4	
	Da cam	orange		5	AG69, CP333
	Đỏ	red		6	
	Tím	purple		7	Fancy Purple 111

1. Stage of evaluation : Reopening
2. Position of evaluation: Grain on the middle part of the upper ear
3. Method of evaluation: Visible group



	Vietnamese	English	Stage	Note	Example varieties
41	Bắp: sắc tố antoxian của mày hạt trên lõi	Ear: anthocyanin coloration of glumes of cob	93		
QN	Không có hoặc rất nhạt	absent or very weak		1	LVN45
VG	Nhạt	weak		3	
	Trung bình	medium		5	HK4
	Đậm	strong		7	
	Rất đậm	very strong		9	Fancy Purple 111

1. Stage of evaluation : Repeping
2. Position of evaluation: Glumes of cob on the middle part of the upper ear
3. Method of evaluation: Visible group



1



3



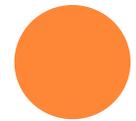
5



7



9



***THANK YOU
FOR YOUR ATTENTION !***

