



Evaluation of commercial banana cultivars from four village tracts in Kyaukse Township

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Abstract

The evaluation of commercial banana cultivars of four village tracts (Han myint mo, Pon nyet kye, Kyar ka and Thanywa) in Kyaukse Township was conducted. The thirteen bananas cultivars were collected and identified as six species according to taxonomic identification. The cultivar Thihmwe and Mya sein belong to *Musa acuminata*; Wet ma lut to *M. cavendishi*; Phee gyan, Hnget pya, Thu nge sa and Byat pyae to *M. chiliocarpa*; Nanthabu to *M. paradisiaca*; Yakhine, Pya ye san, Shwe ni and Shwe sein to *M. sapientum*, and Pyay wet ma lut to *M. sanguinea*. The genome classification was based on the modified genome score card and 15 important characters. The three genome groups were observed. The genome constitution of thirteen different cultivars was triploid, AAA, AAB and ABB. The cultivars Thihmwe, Wet ma lut, Shwe ni, Shwe sein and Mya sein were identified as AAA group, cv. Nanthabu and Pya ye san as the hybrid AAB group and cv. Phee gyan, Hnget pya, Yakhine, Thu nge sa, Byat pyae and Pyay wet ma lut were identified as the hybrid ABB group. In the four village tracts, the cultivars Thihmwe, Wet ma lut, Shwe ni, Shwe sein, Mya sein, Nanthabu, Pya ye san, Thu nge sa, Byat pyae and Pyay wet ma lut were cultivated as home garden for home consumption and minimal inputs. The other hybrid ABB group of Phee gyan, Hnget pya and Yakhine were cultivated for commercial smallholder orchards. The findings of this research will fulfill the useful results on the status of genetic resources about the banana cultivars.

Key words: Banana cultivars, genome constitution, genome score, triploid.

Introduction

Banana belongs to the Family Musaceae, consists of 2 genera, *Musa* and *Ensete* (Cronquist 1981). The number of species under the genus *Musa* has variously reported: 18 species in the tropics of the Old World (Hooker 1885); about 130 species distributed only in tropical region (Lawrence 1964); about 20 spp: in Myanmar (Kress *et al.* 2003).

Banana classification and nomenclature have long been complicated issue. The problem emanated from the simplistic description of plantain, *M. paradisiaca* L. and dessert banana, *M. sapientum* L. In Asia, the center of *Musa* diversity, many local cultivars possess characteristics that transcend the diagnostic characters used elsewhere to differentiate bananas from plantains (Valmayor *et al.* 2000).

Another common problem confronting banana taxonomists and horticulturists in Southeast Asia is the presence of numerous cultivar names and synonyms in different languages and dialects of the region. In most cases, the same cultivars are known by different names in different countries. Simmonds and Shepherd (1955) who explained the origin of edible banana and proposed a new classification scheme (Valmayor *et al.* 2000).

The primitive edible bananas were diploids that evolved through the development of sterility and parthenocarpy in *Musa acuminata*. Later, through chromosome restitution, seedless triploid cultivars developed. Since triploids proved to be more vigorous and productive, they gained greater popularity (Molina *et al.* 1999).

Although commercially importance of various banana cultivars was widely cultivated in Kyaukse Township there was no systematic classification of genome groups. It is coming to need with an accurate identification for commercial banana cultivars. The studied cultivars were collected from the four village tracts: Han myint mo, Pon nyet kye, Kyar ka and Thanywa, situated between 21° 29'N - 21° 32'N latitude and 96° 11'E – 96° 14'E longitude.

The aims of this research are to provide the genome groups of banana cultivars for horticulturists and farmers, and to contribute the genetic information for cytotaxonomic and genetic researches in future study. The objectives are to assess the genomic classification based on 15 morphological characters, to evaluate genome group with the taxonomic characters, to understand the genomic classification with scoring system of banana cultivars.

Materials and Methods

Materials

The thirteen banana cultivars from four village tracts (Han myint mo, Pon nyet kye, Kyar ka and Thanywa) in Kyaukse Township were collected.

Methods

Taxonomic identification: According to the resulting morphological characteristics, the specimens were identified by Hooker (1885), Backer (1968) and Dassanayake (2000).

Genome group's analysis: The 15 important characters of all collected samples were used for scoring system according to Simmonds and Shepherd (1955). The 15 important characters such as pseudostem colour, petiolar canal, peduncle, pedicels, ovules, bract shoulder, bract curling, bract shape, bract apex, bract colour, colour fading, bract scars, free tepal of male flower, male flower colour and stigma colour were described in Table 1.

Scoring System: The scoring based on 15 different characters for distinguishes between the characters of *M. acuminata* and *M. balbisiana*. Each character was scored on a scale as one mark for typical *M. acuminata* character and five marks for typical *M. balbisiana* character. The genome groups and their respective score ranges were described in Table 10, according to the source from Singh and Uma (1996).

Table 1. Fifteen different characters for *Musa acuminata* and *Musa balbisiana*















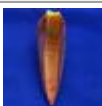















Character	<i>Musa acuminata</i>	<i>Musa balbisiana</i>
Pseudostem colour	 More or less heavily marked with brown or black blotches	 Blotches very slight or absent
Petiole canal	 Margin erect or spreading, with scarious wings below, not clasping pseudostem	 Margin inclosed, not winged but clasping pseudostem
Peduncle	 Usually downy or hairy	 Glabrous
Pedicels	 Short	 Long

Table 1 (continued)

Ovules	 Two regular rows in each loculus	 Four irregular rows in each loculus
Bract shoulder*	 Usually high (ratio <math><0.28</math>)	 Usually low (ratio >math>>0.30</math>)
Bract curling	 Bracts reflex and roll back after opening	 Bracts do not reflex
Bract shape	 Lanceolate or narrowly ovate, tapering sharply from the shoulder	 Broadly ovate, not tapering sharply
Bract apex	 Acute	 Obtuse
Bract colour	 Red, dull purple or yellow outside; pink, dull purple or yellow inside	 Distinctive brownish-purple outside; bright crimson inside
Colour fading	 Inside bract colour usually fades to yellow towards the base	 Inside bract colour usually continuous to base
Bract scars	 Prominent	 Scarcely prominent
Free tepal of male flower	 Variably corrugated below tip	 Rarely corrugated
Male flower colour	 Creamy white	 Variably flushed with pink
Stigma colour	 Orange or rich yellow	 Cream, pale yellow or pale pink

Source: Simmonds and Shepherd 1955

1st Myanmar-Korea Conference

Table. 2 Genome groups and their respective score ranges

Genome Group	Scores
AA/AAA	15-25
AAB	26-45
AB	46-49
ABB	59-65
ABBB	66-69
BB/ BBB	70-75

Source: Singh & Uma (1996)

Results and Discussion

Taxonomic Identification

The thirteen edible bananas cultivars were collected and identified as 6 species belonging to only one genus *Musa* in family Musaceae. The resulting species were described in Table 3. Their taxonomic important characters were expressed in Table 4.

Table. 3 List of the collected cultivars

No.	Scientific name	Cultivar name
1.	<i>Musa acuminata</i> Colla	Thihmwe
2.	<i>M. cavendishi</i> Lam.	Wet ma lut
3.	<i>M. chiliocarpa</i> Backer	Phee gyan
4.	<i>M. chiliocarpa</i> Backer	Hngat pya
5.	<i>M. paradisiaca</i> L.	Nanthabu
6.	<i>M. sapientum</i> L. var. <i>arakanensis</i> Ripl.	Yakhine
7.	<i>M. sapientum</i> L. var. <i>rubra</i> Firminger	Shwe ni
8.	<i>M. sapientum</i> L.	Shwe sein
9	<i>M. acuminata</i> Colla	Mya sein
10	<i>M. sapientum</i> L. var. <i>dacca</i> Horan	Pya ye san
11	<i>M. chiliocarpa</i> Backer	Thu nge sa
12	<i>M. chiliocarpa</i> Backer	Byte pyae
13	<i>M. sanguinea</i> Hook	Pyay wet ma lut

Table 4. Key characters of 13 different cultivars

No.	Cultivars	Pseudostems	Petioles	Midribs	Blades	Peduncles	Bracts	Compound tepals	Free tepals	Fruits
1.	Thihmwe	Slender, green with brown blotches	Open, glaucous	Dark green above yellowish green beneath	Entire and yellowish red lining along the margins	Thickly pubescent	Faintly longitudinal ribbed, caducous	Thick, pale yellow	Translucent	Oblongoid, with ribbed slightly curved, green when ripe, thick skin
2.	Wet malut	Slender, pale green with black blotches	Open glaucous	Dark green above dull green beneath	Entire and reddish-purple lining along the margins	Long and white pubescent	Ribbed, persistent	Leathery, creamy white	Non translucent	Oblongoid, with 5 ribbed slightly curved, greenish yellow when ripe, thick skin
3.	Phee gyan	Robust yellowish green with black blotches	Close, glaucous	Dark green above paler and pruinose beneath	Entire along the margins	Thickly glabrous	Without ribbed, persistent	Thick, dark purple with yellow stration	Murconate	Trigonous, with 4-5 ribbed, brown yellow when ripe, thick skin
4.	Hnget.pya	Slender, dull green with long and back blotches	Close, glaucous	green above dull green beneath	Entire along the margins	Thickly glabrous	Without ribbed, persistent	Thinned, pale purple without stration	Murconate	Trigonous, with 5 ribbed, silver grey when ripe, thick skin
5.	Nanthabu	Slender, yellowish-green with long and back blotches	Open glaucous	dark green above, or yellowish green beneath	Entire along the margins	Thickly glabrous	Without ribbed, caducous	Thick, pale yellow	Murconate	Oblongoid, without ribbed, yellow when ripe, thick skin

6.	Yakhine	Slender, pale green with pinkish purple striation and slightly brown blotches	close glaucous	Yellowish green above, paler green beneath	Entire along the margins	Thickly glabrous	ribbed, caducous	Thick, pinkish purple	Murconate	Oblongoid, without ribbed, yellow when ripe, thick skin
7.	Shwe ni	Slender, red with brown blotches	open glaucous	dark green above, pale green beneath	Entire and with red lining along the margins	Reddish brown, pubescent	ribbed, caducous	Thick, pale yellow with red striation	Murconate	Oblongoid, without ribbed, bright red yellow when ripe, thick skin
8.	Shwe-sein	Robust, dark green with brown blotches	open glaucous	dark green above, dull green beneath	Entire pinkish-purple lining along the margins	Pale green sparsely pubescent	ribbed, caducous	Thick, pale yellow	Murconate	Oblongoid, without ribbed, yellow when ripe, delicate thick skin
9.	Mya sein	slender, tufted, green with black markings when young	open, glaucous	green in both sides	Entire and red lining along the margins	thinned, pubescent	without ribbed caducous	thick, pale yellow	thick translucent	oblongoid, green when ripen, thick skin ; sweet, fragrant
10.	Pya ye san	robust, slightly tufted, pale green with pinkish striation and slightly black blotches	open, glaucous	red in both sides	rounded at the base with pink lining along the margins	slightly thickened, glabrous	without ribbed caducous	slightly thick, pale orange with purple striation	thinned, white	trigonous, yellow when ripen, thin skin ; slightly sour, fragrant
11.	Thu nge sa	robust, tufted, green with brown blotches	close, glabrous	green in both sides	Entire along the margins	thinned, glabrous	ribbed long persistent	slightly thick, pale purple with yellow striation	thinned, pale purple	tetragonous, pale gray when ripen, slightly thick skin, sweet, fragrant

12.	Byat pyae	robust, dark green with black blotches	close, glabrous	green in both sides	entire along the margins	thinned, glabrous	ribbed long persistent	slightly thick, pale purple with yellow striation	thinned, pink	trigonus, brownish yellow when ripen, very thick skin, non-sweet, not-fragrant
13.	Pyay wet ma lut	slender, slightly tufted, green with pinkish coloured and large black blotches	open, glaucous	green in both sides	entire and black lining along the margins	thinned, glabrous	ribbed long persistent	thinned, pinkish purple	thinned, creamy coloured	oblong-trigonus, yellow when ripe, thin skin, sweet, fragrant

Analysis of Genome Groups

In this research 13 cultivars belonging to one genera of family Musaceae were described. Based on the morphological scores of Simmonds and Shepherd (1955), all cultivars in four village tracts were classified into three different genome groups. All cultivars are also triploid in nature. Among them the group AAA is *acuminata* cultivars, AAB and ABB are hybrid cultivars. Genome score of each cultivar was described in Table 5 to 9. Their Genome Groups were shown in Table 10.

The total genome score of cv. Thihmwe, Wet ma lut, Shwe ni, Shwe sein and Mya sein were observed as 19, 23, 23, 19 and 19 respectively. They also belonging to a triploid AAA genome group because of their score range were felt in 15-25 (Table 5, 6, 7, 8 and Figure 1, 2, 7, 8, 9).

Likewise, the total genome score of Phee gyan, Hnget pya, Yakhine, Thu nge sa, Byat pyae and Pyay wet ma lut were observed as 59, 63, 63, 59, 63 and 59 respectively. They also belonging to a triploid ABB genome group because of their score range were in 59-65 (Table 6, 7, 8 and Figure 3, 4, 6, 11, 12, 13).

The total genome score of cv. Nanthabu was 27 and cv. Pya ye san was 39. They were belonging to AAB genome group and a triploid hybrid due to their score range was in 26-45 (Table 7, 8 and Figure 5, 10).

The same score 19 was observed in cv. Thihmwe, Shwe sein and Mya sein but they are differ in their pseudostem color, fruit shape and pulp color. The cultivars Wet ma lut and Shwe ni have the same scores 23 but they also differ in morphological characters such as pseudostem height, pseudostem colour, differ in number of hands, fruit shape, pulp and peel colour. Although the same score (63) and same genome group (ABB) was found in cv. Hnget pya and Yakhine differ in their fruit shape, peel and pulp colour. In studied areas AAA group and AAB group were grown as home garden for home consumption. On the other hand ABB group were thrived for commercial.

The genome constitution can be determined in their total score. Genome composition has played an important role in the classification of bananas. The major groups include diploid, triploid and tetraploid. In this research only triploid group was observed such as AAA, AAB and ABB, not found in diploid and tetraploid. According to this finding the cultivated banana cultivars in Kyaukse Township were triploid; it indicated that they gained greater popularity for their various qualities.

Table 5. Genome scores for *Musa acuminata* Colla cv. Thihmwe

No	Characters	<i>Musa acuminata</i>		<i>M. balbisiana</i>	
		A genome 1 mark	Marks	B genome 5 marks	Marks
1	Pseudostem color	Marked with heavy brown blotches	1	-	-
2	Petiole canal	Margin spreading with wings below not clapping the pseudostem	1	-	-
3	Peduncle	Hairy	1	-	-
4	Pedicles	Short (10-15 mm)	1	-	-
5	Ovules	Two regular rows in each loculus	1	-	-
6	Bract shoulder	High (ratio = 0.25)	1	-	-
7	Bract shape	Lanceolate tapering sharply from the shoulder	1	-	-
8	Bract curling	Bracts reflex and roll back after opening	1	-	-
9	Bract apex	Acute	1	-	-
10	Bract color	Red, yellow outside; pink, yellow inside	1	-	-
11	Color fading	Inside bract color fades to yellow towards the base	1	-	-
12	Bract scars	Prominent	1	-	-
13	Free tepal of male flower	Two-three corrugated below tip	1	-	-
14	Male flower color	Creamy white	1	-	-
15	Stigma color	-	-	Pale yellow	5
			14		5
Total scores			19		

Table 6. Genome scores for banana cultivars of Wet ma lut, Phee gyan, Hngget pya

No	Characters	<i>Musa cavendishi</i> cv. Wet ma lut		<i>Musa chiliocarpa</i> cv. Phee gyan		<i>Musa chiliocarpa</i> cv. Hngget pya	
		<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>balbisiana</i> characters B genome 5 marks	<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>balbisiana</i> characters B genome 5 marks	<i>M.</i> <i>acuminata</i> characters A genome 1 mark
1	Pseudostem color	1	-	1	-	1	-
2	Petiole canal	1	-	-	5	-	5
3	Peduncle	1	-	-	5	-	5
4	Pedicles	1	-	-	5	-	5
5	Ovules	1	-	-	5	-	5
6	Bract shoulder	1	-	-	5	-	5
7	Bract shape	1	-	1	-	1	-
8	Bract curling	1	-	-	5	-	5
9	Bract apex	1	-	-	5	-	5
10	Bract color	1	-	-	5	-	5
11	Color fading	1	-	-	5	-	5
12	Bract scars	-	5	1	-	1	-
13	Free tepal of male flower	1	-	1	-	-	5
14	Male flower color	1	-	-	5	-	5
15	Stigma color	-	5	-	5	-	5
		13	10	4	55	3	60
	Total scores	23		59		63	

Table 7. Genome scores for banana cultivars of Nanthabu, Yakhine, Shwe ni

No	Characters	<i>Musa paradisiaca</i> cv. Nanthabu		<i>Musa sapientum</i> L. var. <i>arakanensis</i> cv. Yakhine		<i>Musa sapientum</i> L. var. <i>rubra</i> cv. Shwe ni	
		<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>balbisiana</i> characters B genome 5 marks	<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>balbisiana</i> characters B genome 5 marks	<i>M.</i> <i>acuminata</i> characters A genome 1 mark	<i>M.</i> <i>balbisiana</i> characters B genome 5 marks
		1	Pseudostem color	-	5	-	5
2	Petiole canal	1	-	-	5	1	-
3	Peduncle	-	5	-	5	1	-
4	Pedicles	1	-	-	5	1	-
5	Ovules	1	-	-	5	1	-
6	Bract shoulder	1	-	-	5	1	-
7	Bract shape	1	-	1	-	1	-
8	Bract curling	1	-	-	5	1	-
9	Bract apex	1	-	-	5	1	-
10	Bract color	1	-	-	5	1	-
11	Color fading	1	-	-	5	1	-
12	Bract scars	-	5	1	-	1	-
13	Free tepal of male flower	1	-	1	-	1	-
14	Male flower color	1	-	-	5	-	5
15	Stigma color	1	-	-	5	-	5
		12	15	3	60	13	10
	Total scores	27		63		23	

Table 8. Genome scores for banana cultivars of Shwe sein, Mya sein, Pya ye san

No	Characters	<i>Musa sapientum</i> cv. Shwe sein		<i>Musa acuminata</i> cv. Mya sein		<i>Musa sapientum</i> L. var <i>dacca</i> cv. Pya ye san	
		<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters	<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters	<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters
		A genome 1 mark	B genome 5 marks	A genome 1 mark	B genome 5 marks	A genome 1 mark	B genome 5 marks
1	Pseudostem color	1	-	1	-	1	-
2	Petiole canal	1	-	1	-	1	-
3	Peduncle	1	-	1	-	-	5
4	Pedicles	1	-	1	-	1	-
5	Ovules	1	-	1	-	1	-
6	Bract shoulder	1	-	1	-	-	5
7	Bract shape	1	-	1	-	-	5
8	Bract curling	1	-	1	-	1	-
9	Bract apex	1	-	1	-	-	5
10	Bract color	1	-	1	-	-	5
11	Color fading	1	-	1	-	-	5
12	Bract scars	1	-	1	-	1	-
13	Free tepal of male flower	1	-	1	-	1	-
14	Male flower color	1	-	1	-	1	-
15	Stigma color	-	5	-	5	1	-
		14	5	14	5	9	30
	Total scores	19		19		39	

Table 9. Genome scores for banana cultivars of Thu nge sa, Byat pyae, Pyay wet ma lut

No	Characters	<i>Musa chiliocarpa</i> cv. Thu nge sa		<i>Musa chiliocarpa</i> cv. Byat pyae		<i>Musa sanguinea</i> cv. Pyay wet ma lut	
		<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters	<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters	<i>M.</i> <i>acuminata</i> characters	<i>M.</i> <i>balbisiana</i> characters
		A genome 1 mark	B genome 5 marks	A genome 1 mark	B genome 5 marks	A genome 1 mark	B genome 5 marks
1	Pseudostem color	1	-	1	-	1	-
2	Petiole canal	-	5	-	5	1	-
3	Peduncle	-	5	-	5	-	5
4	Pedicles	-	5	-	5	-	5
5	Ovules	-	5	-	5	-	5
6	Bract shoulder	-	5	-	5	-	5
7	Bract shape	-	5	-	5	-	5
8	Bract curling	1	-	-	5	-	5
9	Bract apex	-	5	-	5	-	5
10	Bract color	-	5	-	5	-	5
11	Color fading	-	5	-	5	-	5
12	Bract scars	1	-	1	-	1	-
13	Free tepal of male flower	1	-	1	-	1	-
14	Male flower color	-	5	-	5	-	5
15	Stigma color	-	5	-	5	-	5
		4	55	3	60	4	55
	Total scores	59		63		59	

Table 10 Genome scores and groups of thirteen banana cultivars

No.	Cultivars (Local name)	Scientific name	Scores	Genome group
1.	Thihmwe	<i>Musa acuminata</i> Colla	19	AAA
2.	Wet ma lut	<i>Musa cavendishi</i> Lam.	23	AAA
3.	Phee gyan	<i>Musa chiliocarpa</i> Backer	59	ABB
4.	Hnget pya	<i>Musa chiliocarpa</i> Backer	63	ABB
5.	Nanthabu	<i>Musa paradisiaca</i> L.	27	AAB
6.	Yakhine	<i>Musa sapientum</i> L.var. <i>arakanensis</i> Ripl.	63	ABB
7.	Shwe ni	<i>Musa sapientum</i> L. var. <i>rubra</i> Firminger	23	AAA
8.	Shwe sein	<i>Musa sapientum</i> L.	19	AAA
9.	Mya sein	<i>Musa acuminata</i> Colla	19	AAA
10.	Pya ye san	<i>Musa sapientum</i> L.var <i>dacca</i> Horan	39	AAB
11.	Thu nge sa	<i>Musa chiliocarpa</i> Backer	59	ABB
12.	Byat pyae	<i>Musa chiliocarpa</i> Backer	63	ABB
13.	Pyaywetmalut	<i>Musa sanguinea</i> Hook	59	ABB

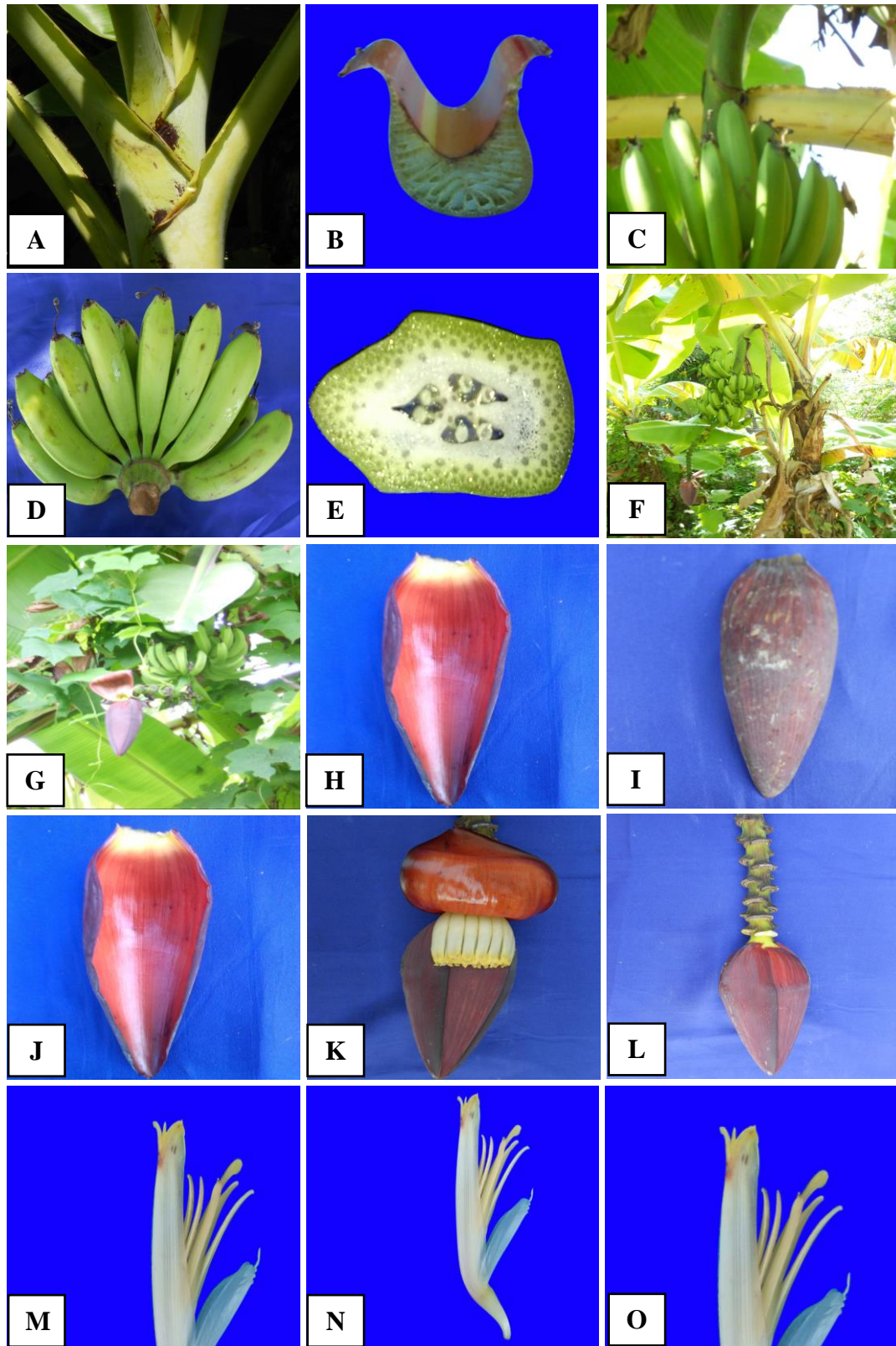


Figure 1. Important characters of *Musa acuminata* Colla, cv. Thihmwe

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

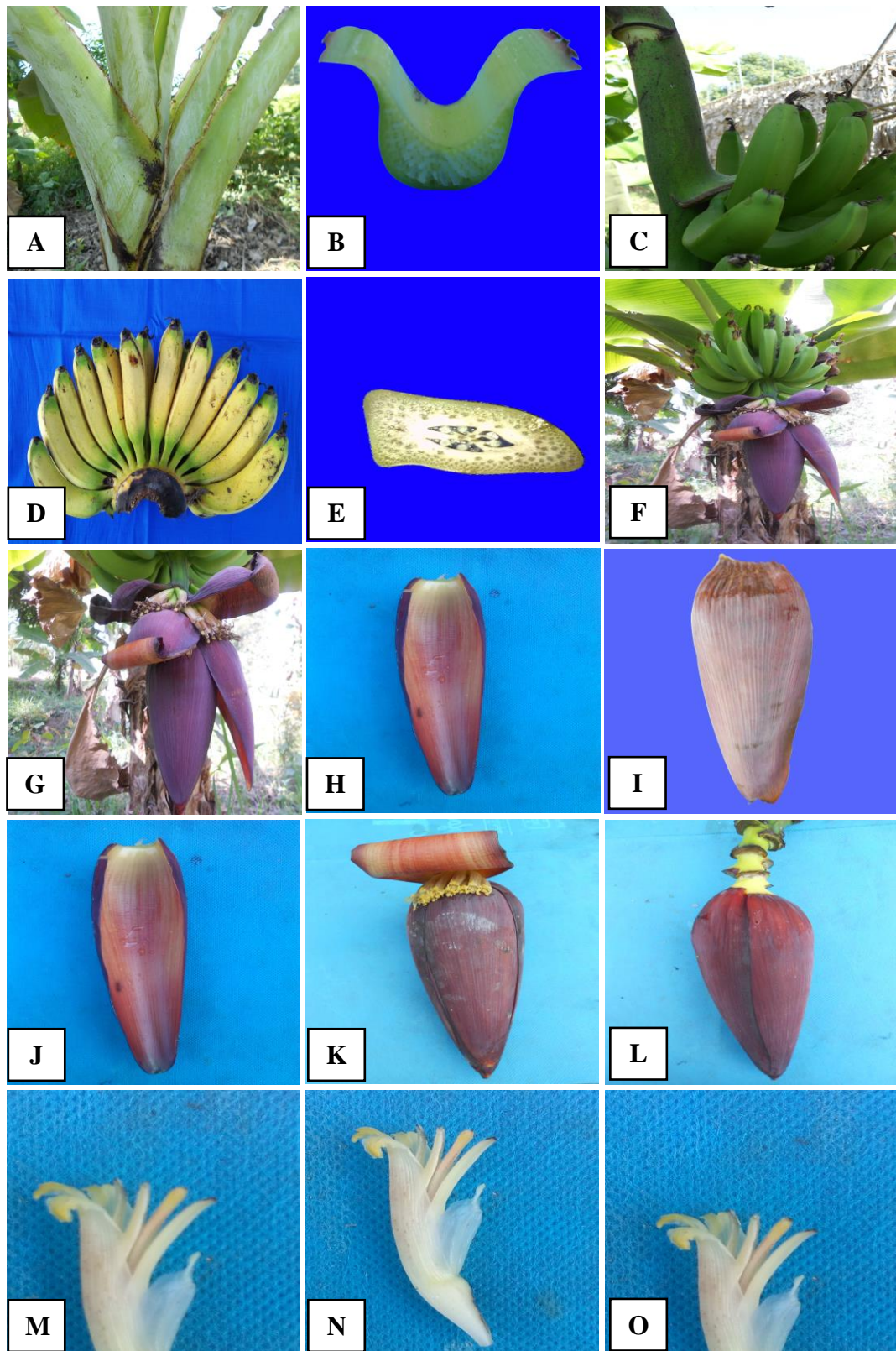


Figure 2. Important characters of *Musa cavendishi* Lam. cv. Wet ma lut

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

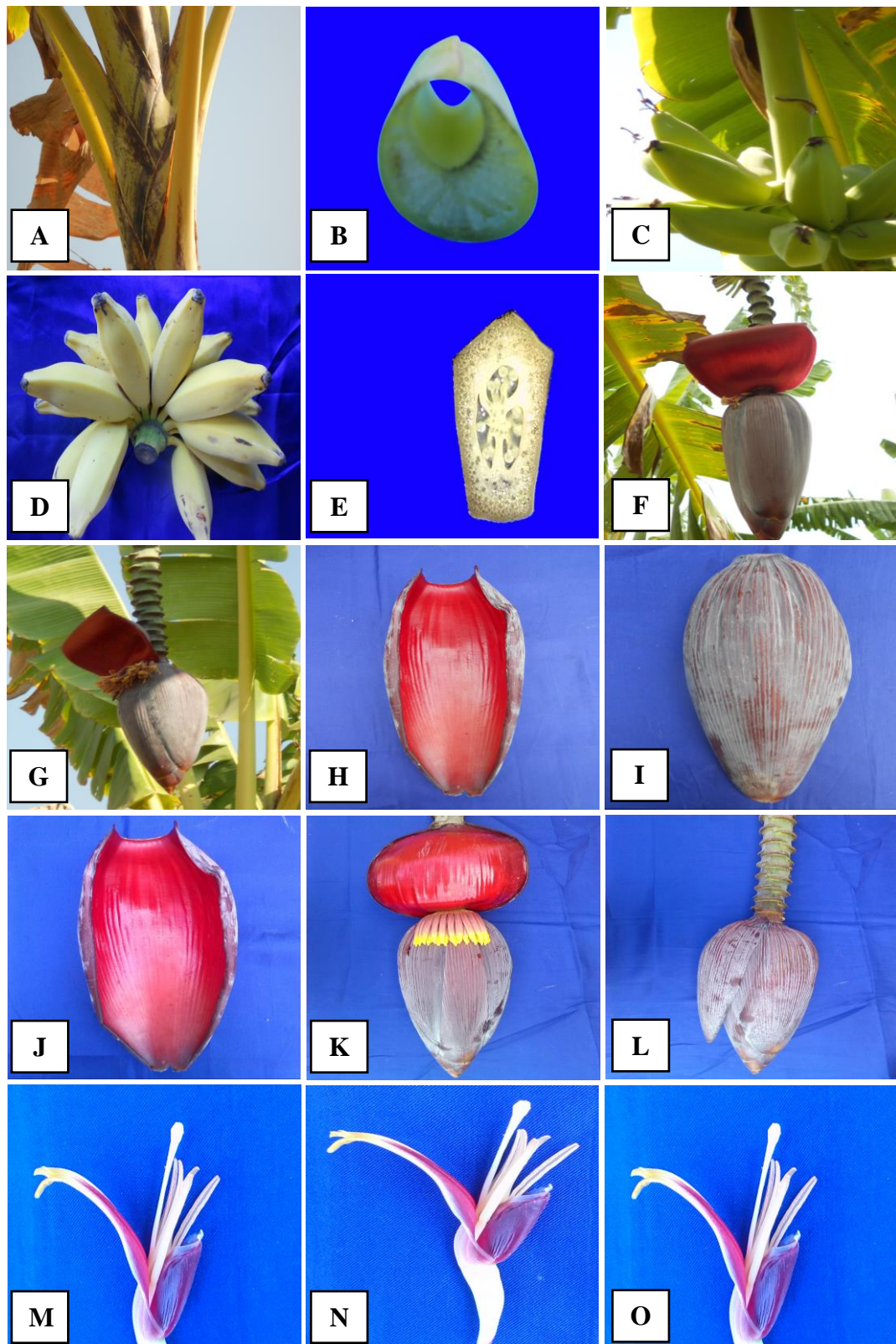


Figure 3. Important characters of *Musa chiliocarpa* Backer cv. Phee gyan

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

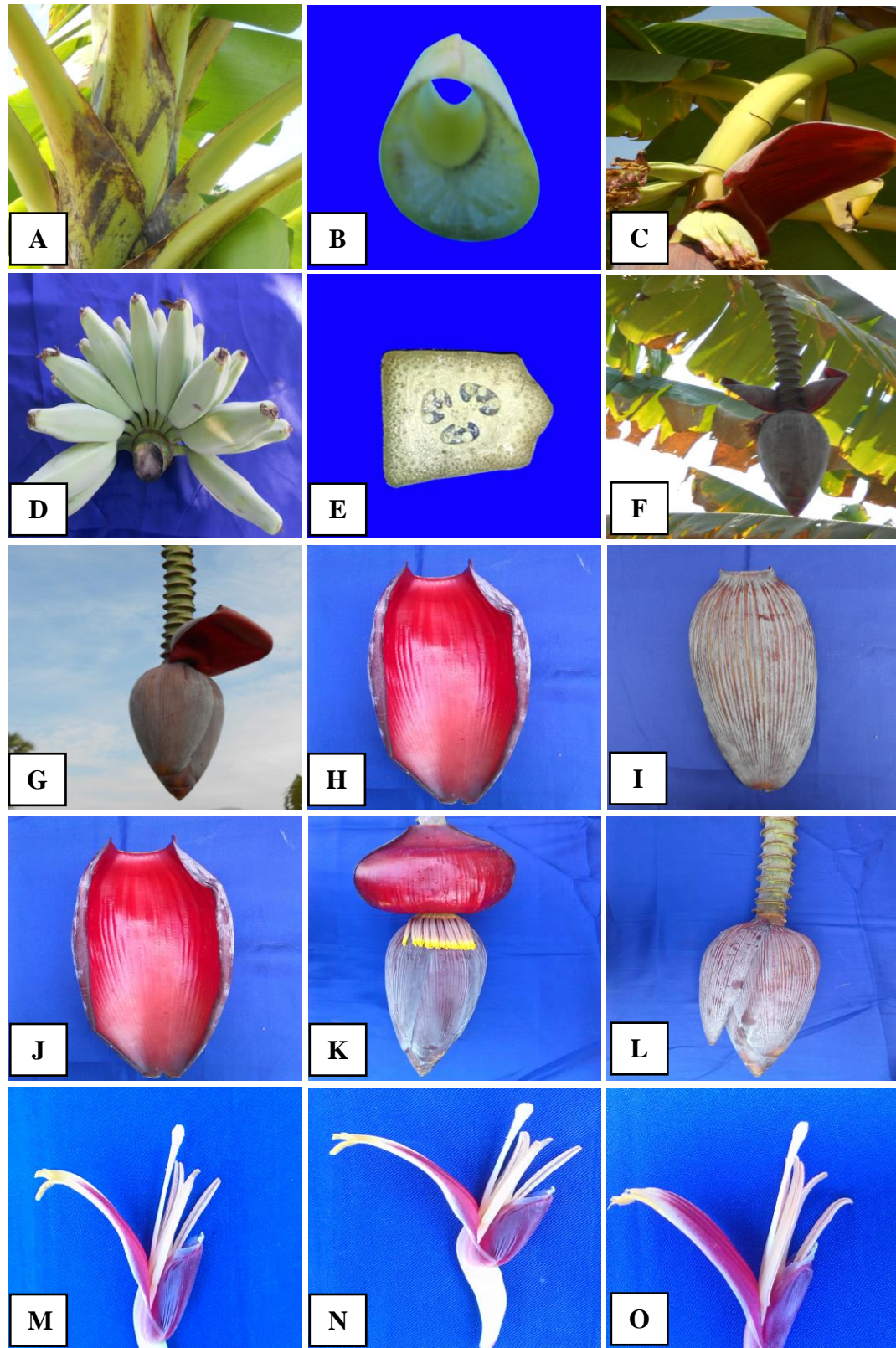


Figure 4. Important characters of *Musa chiliocarpa* Backe cv. Hnget pya

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

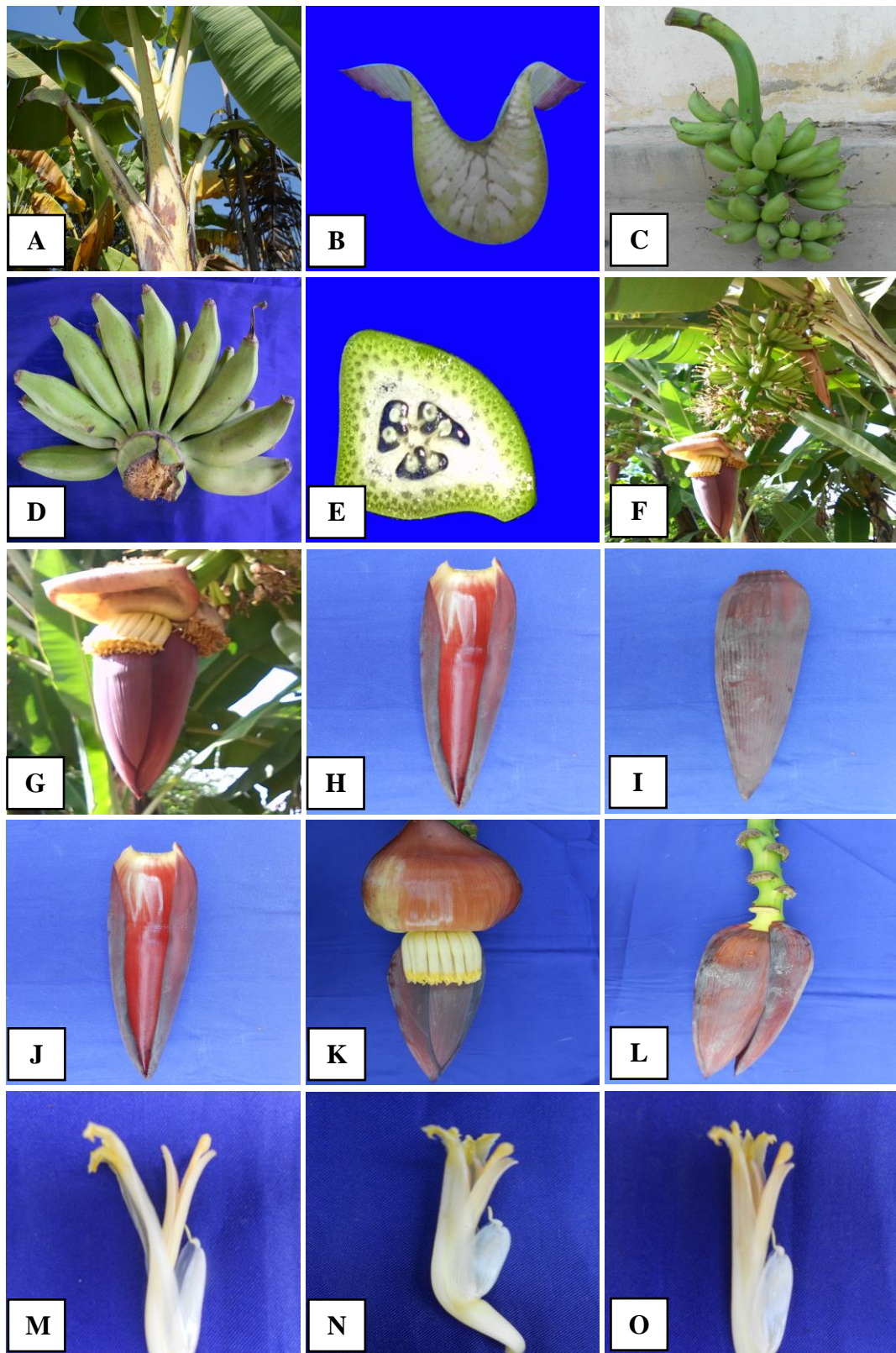


Figure 5. Important characters of *Musa paradisiaca* L. cv. Nanthabu

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

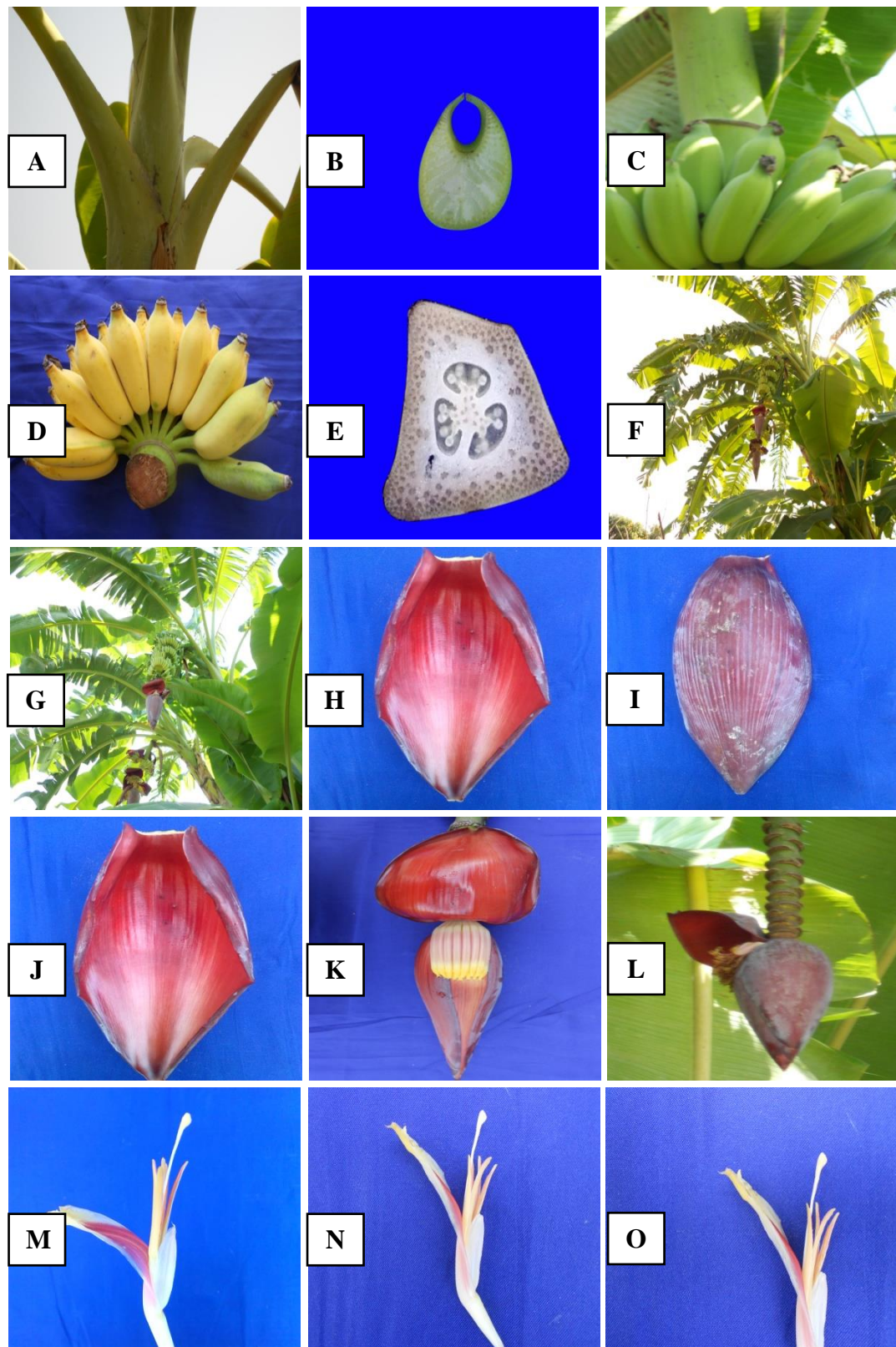


Figure 6. Important characters of *Musa sapientum* L. var. *arakanensis* Ripl. cv. Yakhine

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

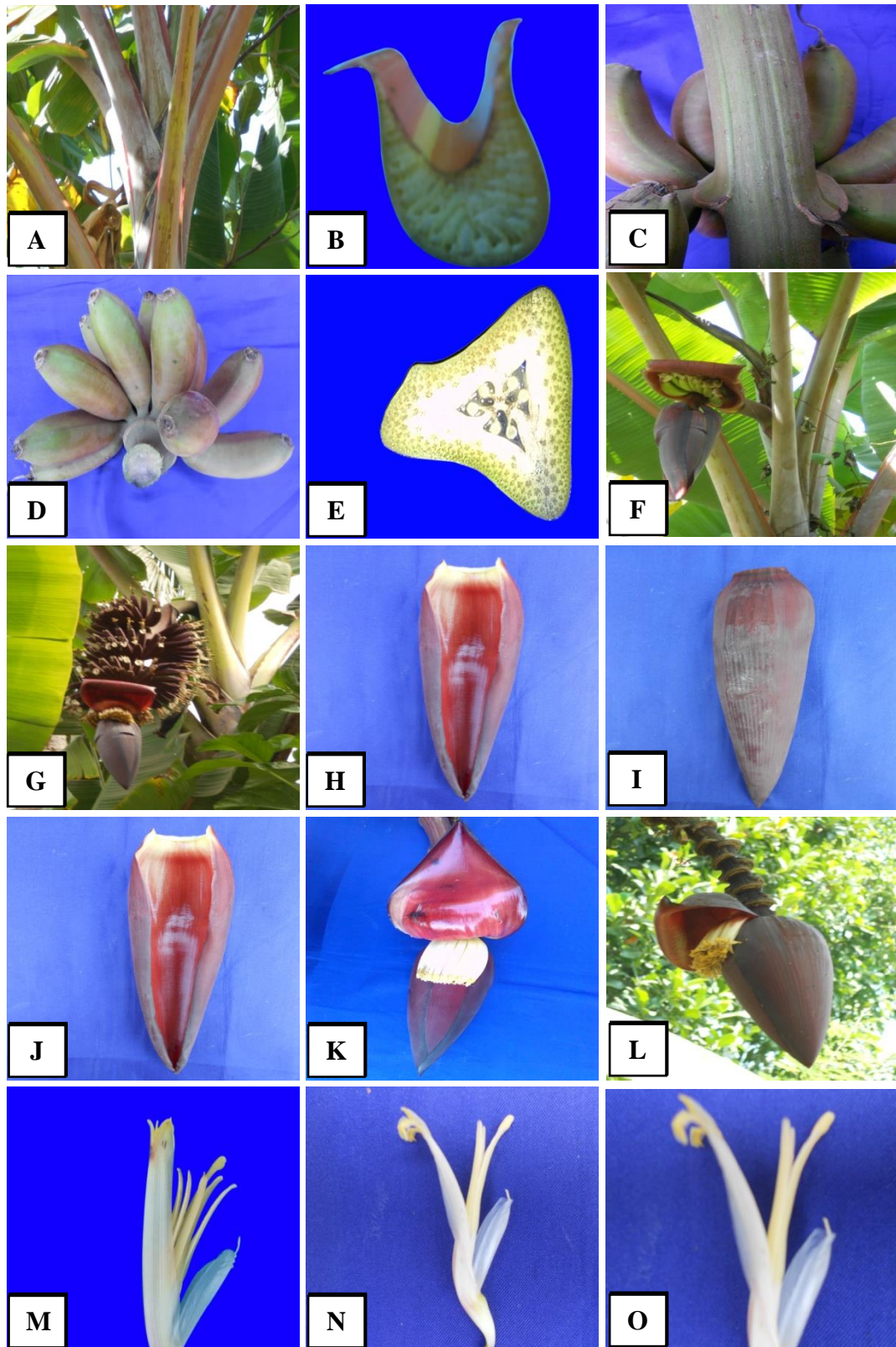


Figure 7. Important characters of *Musa sapientum* L. var. *rubra* Firminger cv. Shwe ni

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

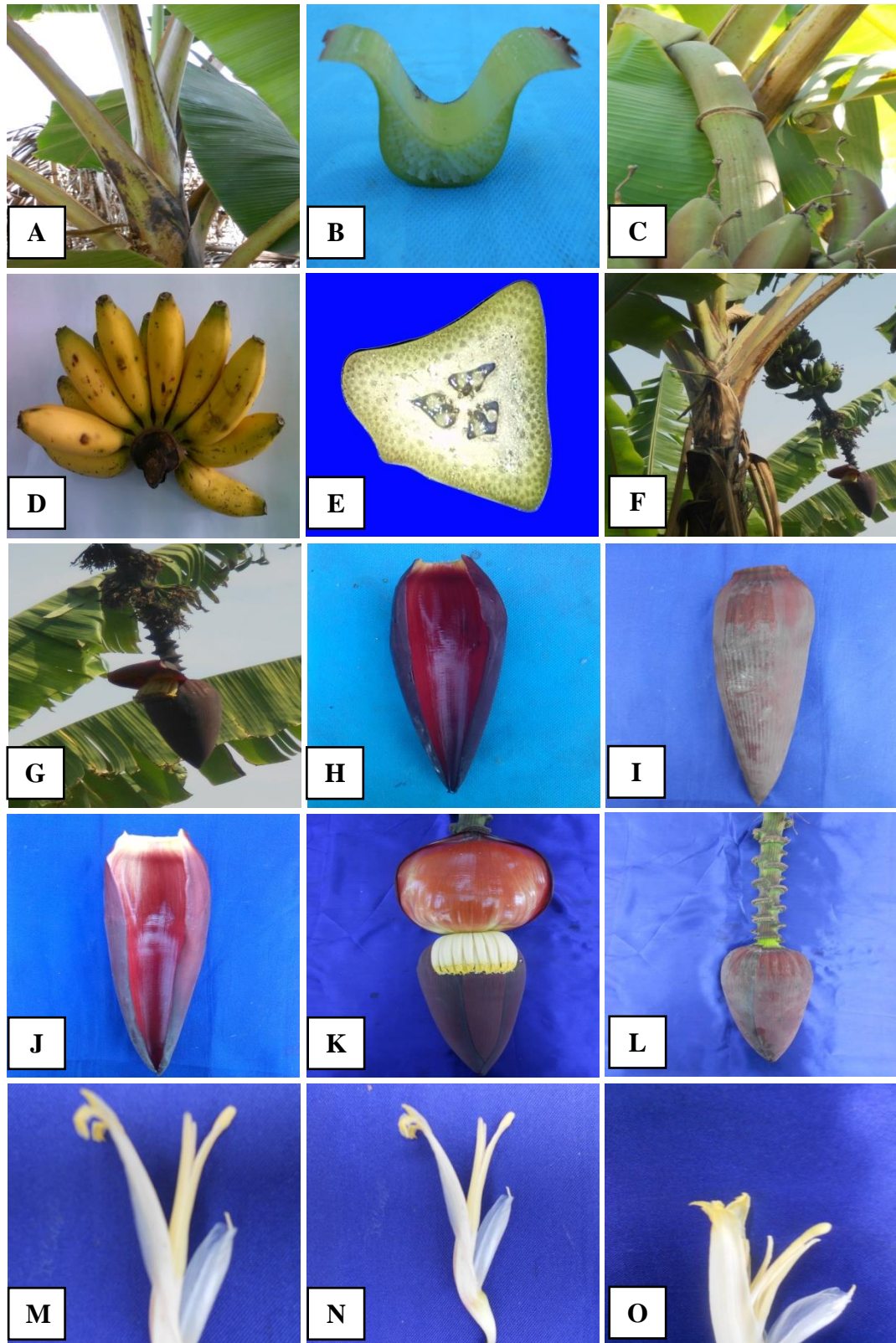


Figure 8. Important characters of *Musa sapientum* L. cv. Shwe sein

A. Pseudostem

B. Petiolar canal

C. Peduncle

D. Pedicels,

E. Ovules

F. Bract shoulder

G. Bract curling

H. Bract

I. Bract apex

J. Bract color

K. Colour fading

L. Bract scars

M. Free tepal of male flower

N. Male flower

O. Stigma

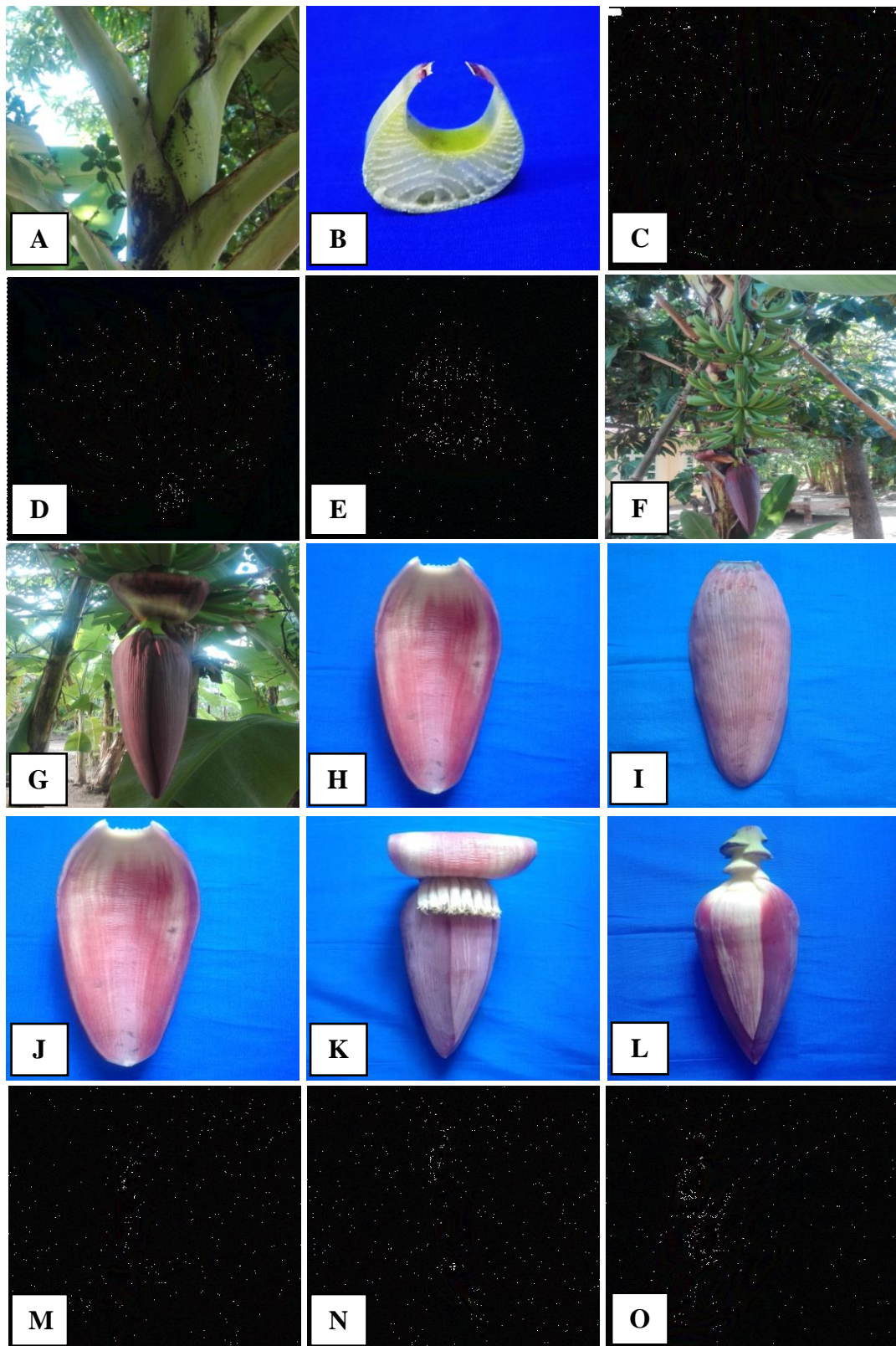


Figure 9. Important characters of *Musa acuminata* Colla cv. *Mya sein*

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

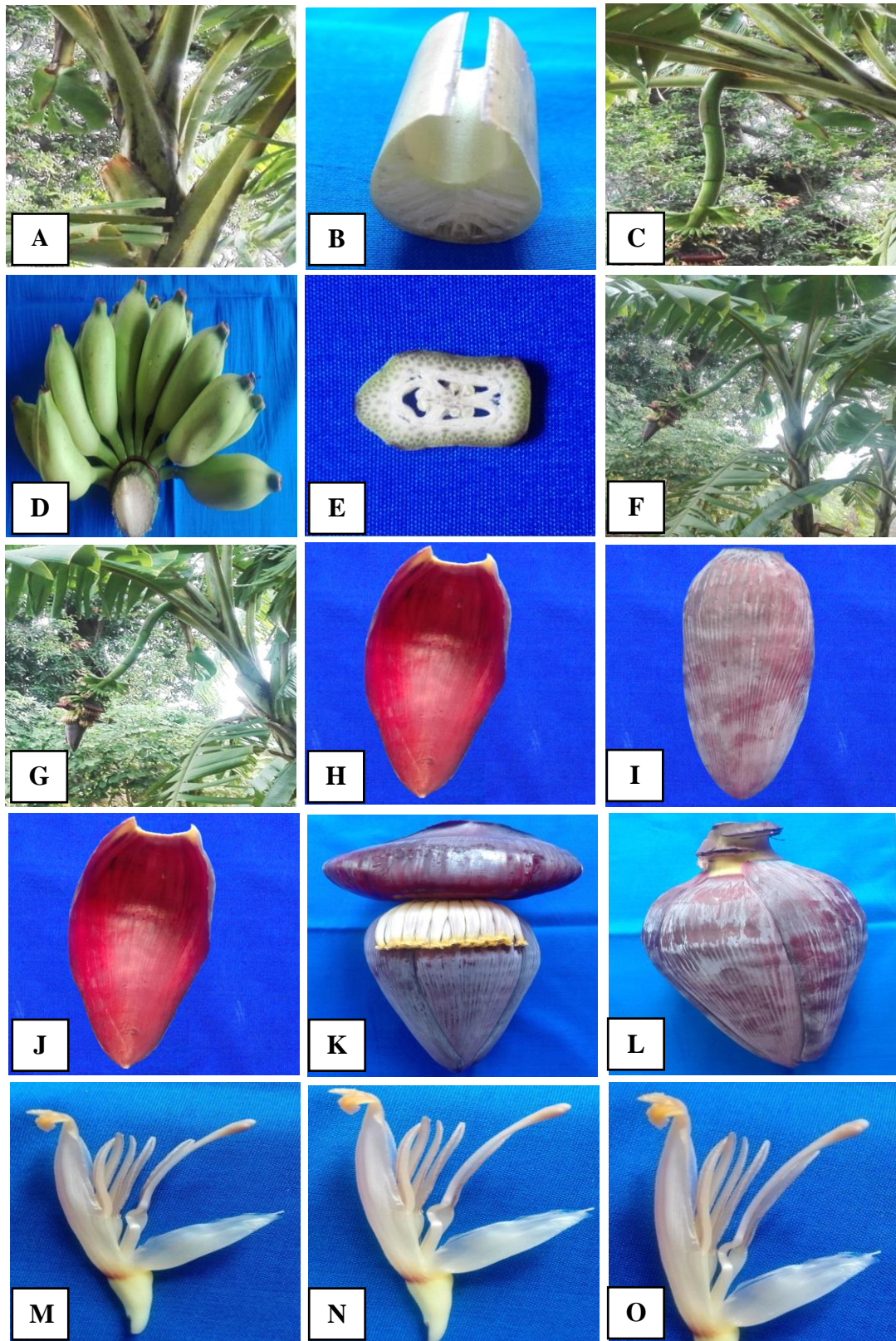


Figure 10. Important characters of *Musa sapientum* L. var. *dacca* Horancv. Pya ye san

A. Pseudostem
B. Petiolar canal
C. Peduncle
D. Pedicels,
E. Ovules

F. Bract shoulder
G. Bract curling
H. Bract
I. Bract apex
J. Bract color
K. Colour fading
L. Bract scars

M. Free tepal of male flower
N. Male flower
O. Stigma

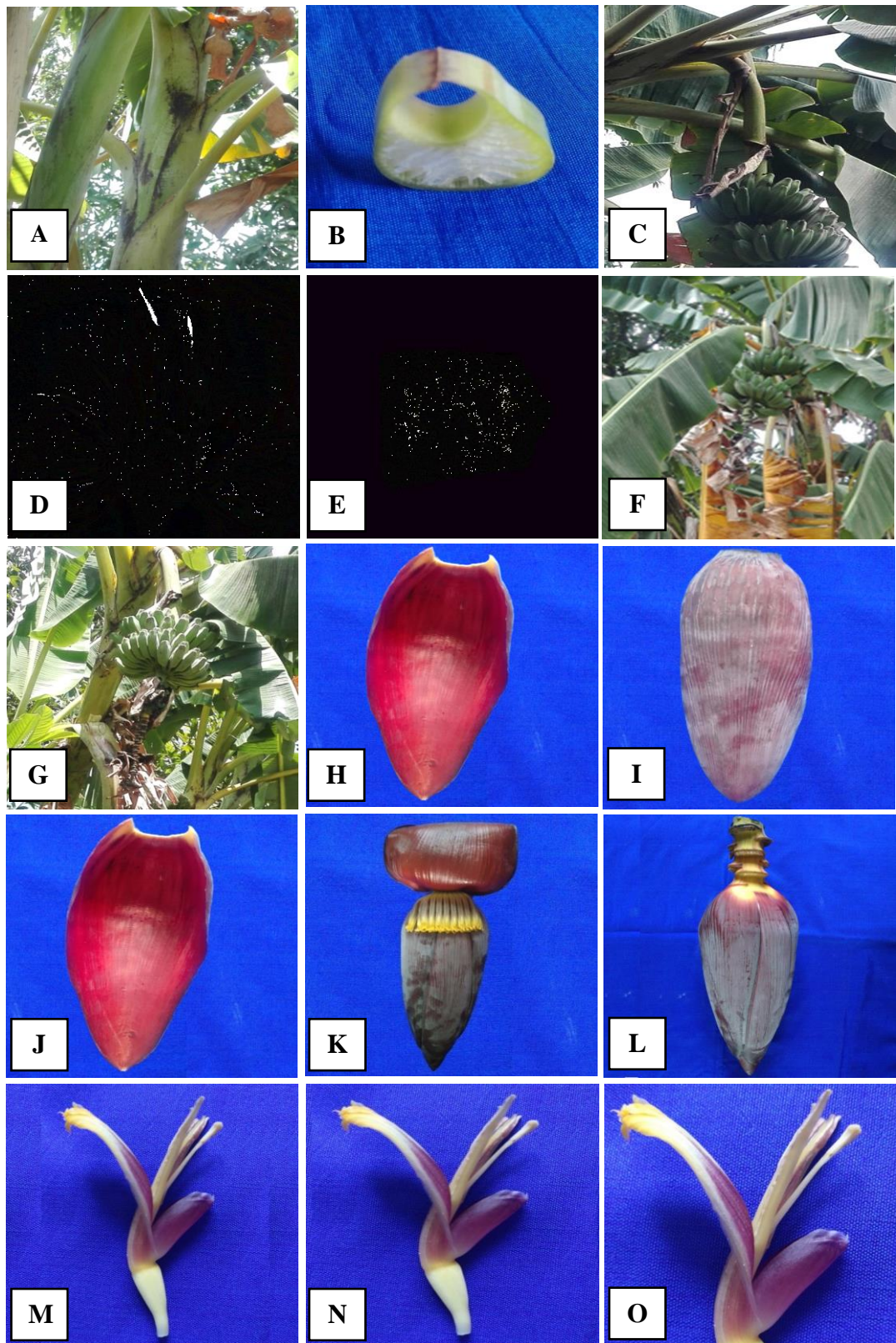


Figure 11. Important characters of *Musa chiliocarpa* Backer cv. Thu nge sa

A. Pseudostem	F. Bract shoulder	K. Colour fading
B. Petiolar canal	G. Bract curling	L. Bract scars
C. Peduncle	H. Bract	M. Free tepal of male flower
D. Pedicels,	I. Bract apex	N. Male flower
E. Ovules	J. Bract color	O. Stigma

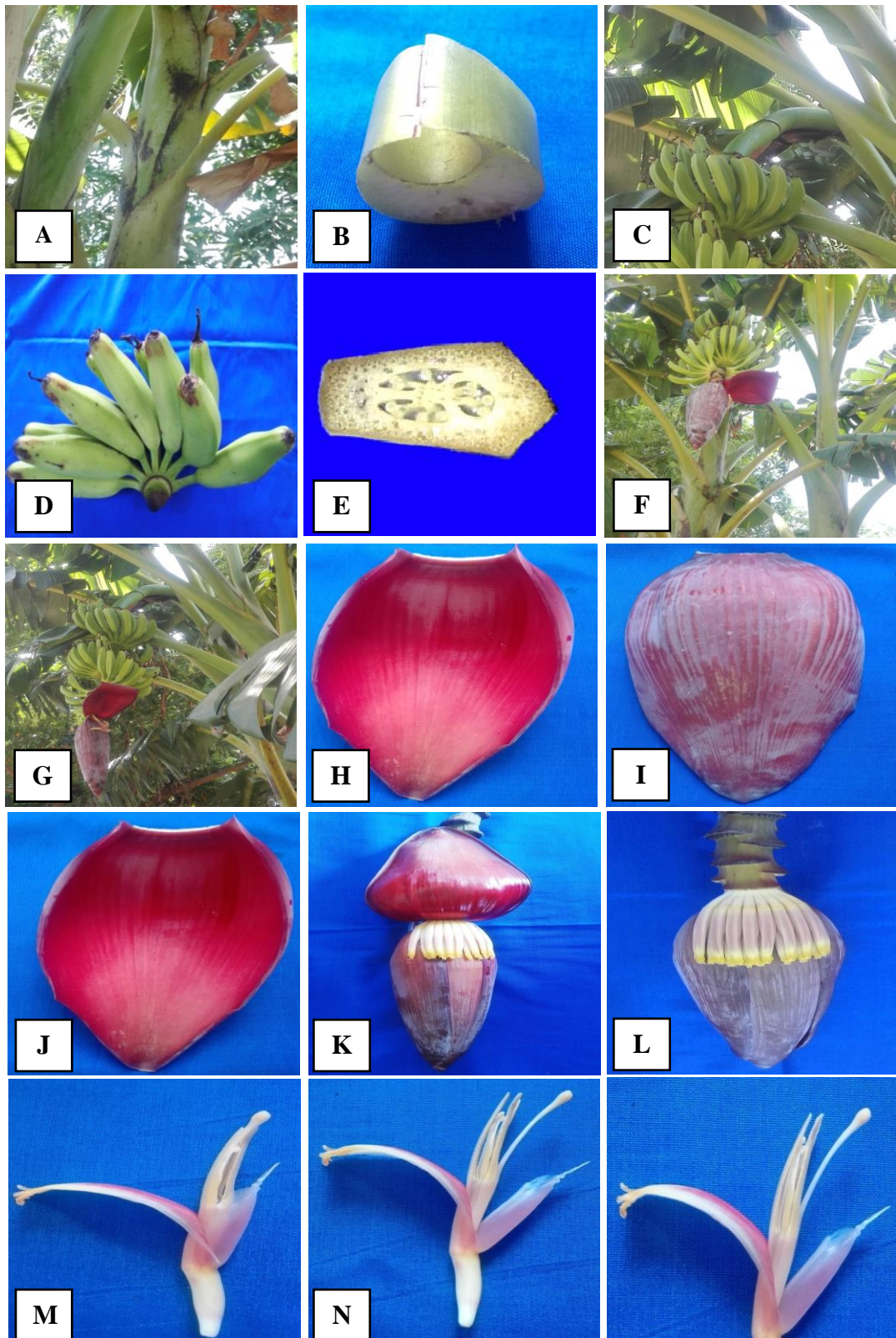


Figure 12. Important characters of *Musa chiliocarpa* cv. Byat pyae

- | | | |
|-------------------|-------------------|------------------------------|
| A. Pseudostem | F. Bract shoulder | K. Colour fading |
| B. Petiolar canal | G. Bract curling | L. Bract scars |
| C. Peduncle | H. Bract | M. Free tepal of male flower |
| D. Pedicels, | I. Bract apex | N. Male flower |
| E. Ovules | J. Bract color | O. Stigma |

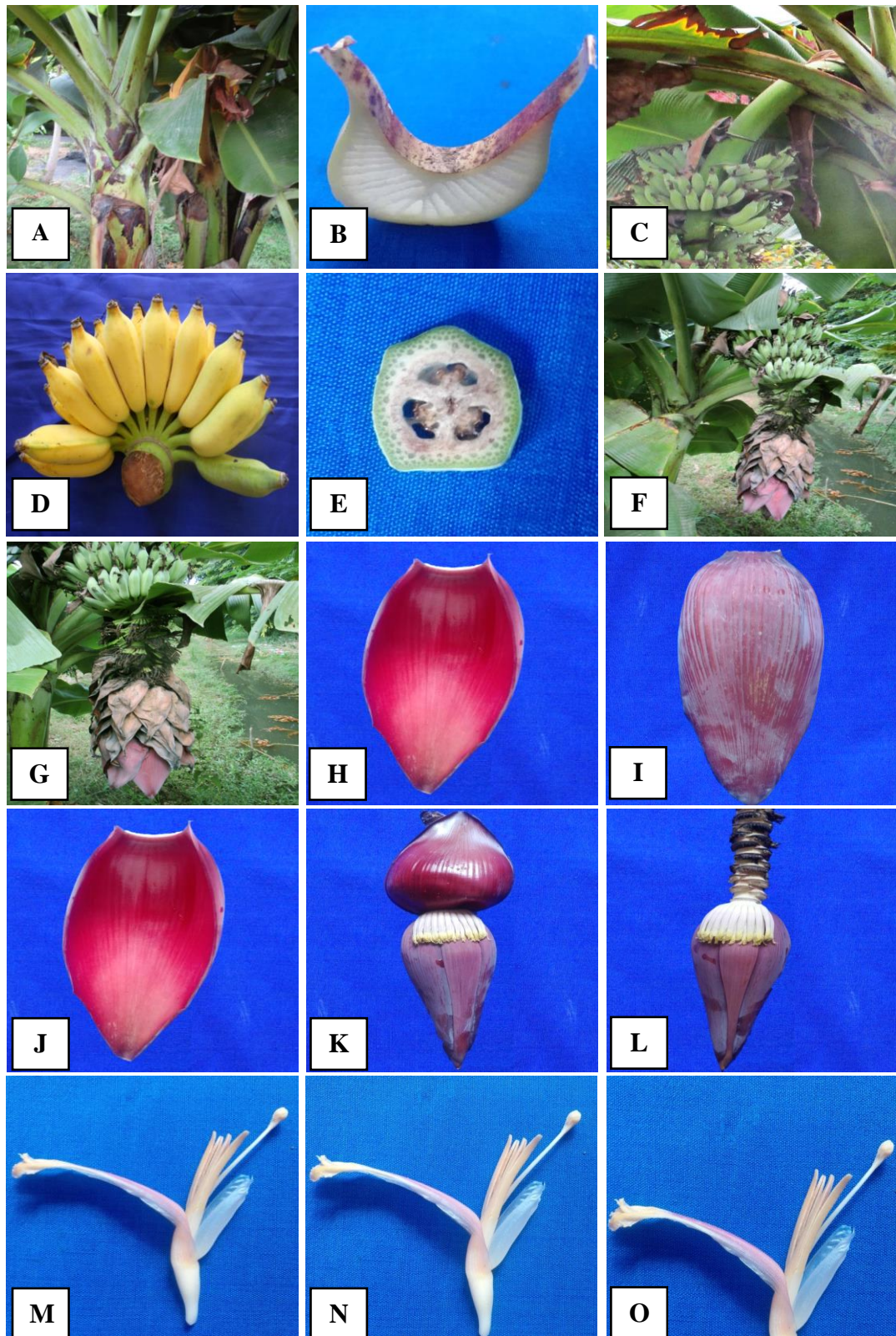


Figure 13. Important characters of *Musa sanguinea* Hook cv. Pyay wet ma lut

A. Pseudostem

B. Petiolar canal

C. Peduncle

D. Pedicels,

E. Ovules

F. Bract shoulder

G. Bract curling

H. Bract

I. Bract apex

J. Bract color

K. Colour fading

L. Bract scars

M. Free tepal of male flower

N. Male flower

O. Stigma

Conclusion

The identification of cultivars and classification of their genome groups will thus strengthen establishment of *Musa* improvement strategy. The present research is thus very important for which the cultivars confusion would be able to resolve among the farmers and for selection of the parent plants for breeding stock. It also provides the status of existing banana genetic resources from Kyaukse Township which could be utilized in improvement and conservation programs where valuable genetic resources are available. The findings of this study will provide useful information on the status of the banana cultivars for horticulturalists and future study for cytotaxonomy.

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I am grateful to Dr Tin Tin Nyunt, Professor and Head, Department of Botany, University of Kyaukse for valuable suggestions, facilities and constant support.

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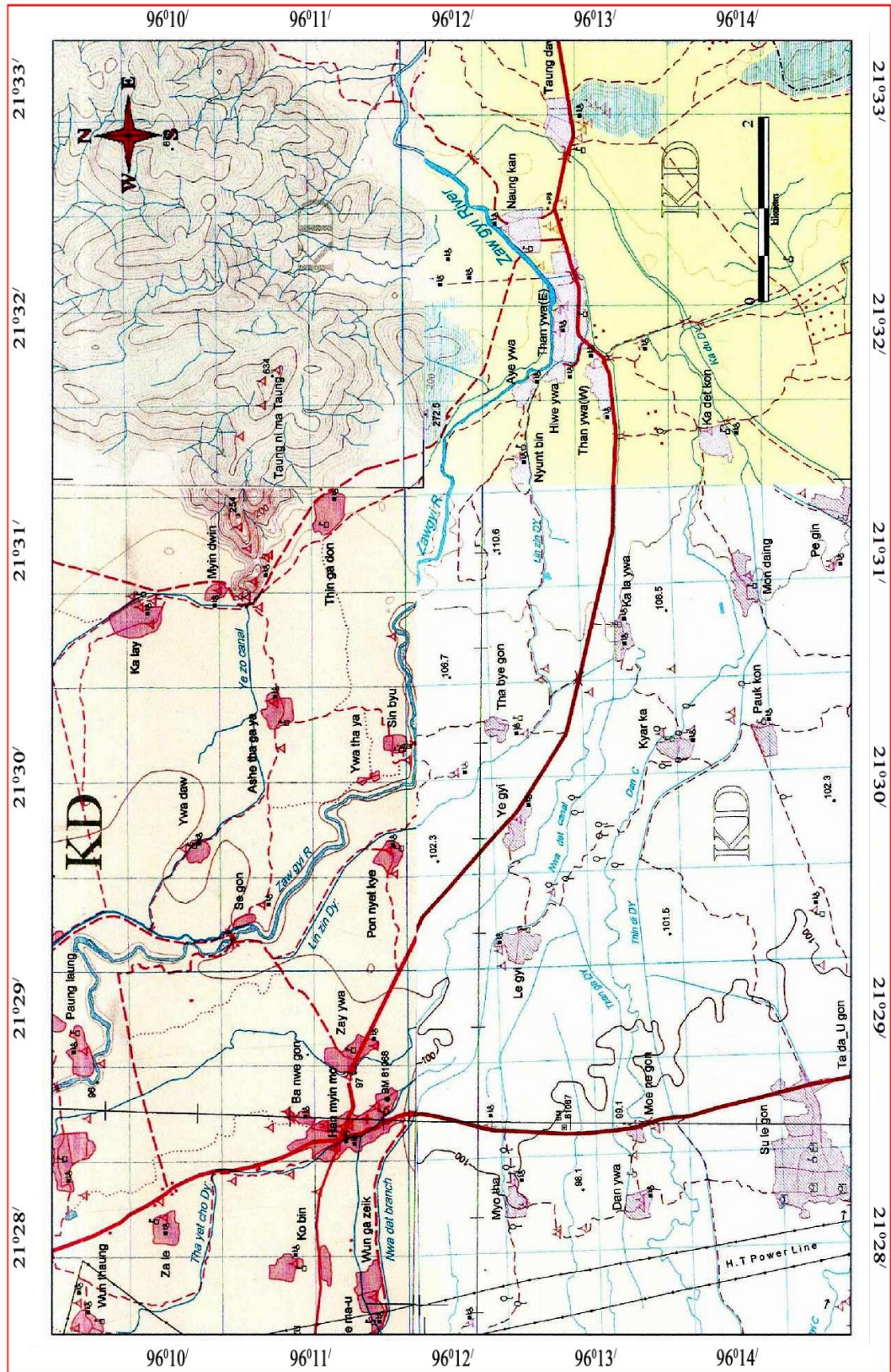
I also thank U Tun Win, Dy. Regional Director, Department of Industrial Crops Development, Nay pyi taw, and Mandalay Region.

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APPENDIX

Map of Study Areas in Han myint mo, Pon nyet kye, Kyar ka, Thanywa



Source: Department of Geology, Kyaukse University