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Identification and characterization of Talas banana, a superior local cultivar from East Kalimantan (Indonesia), based on morphological and agronomical characters

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Abstract. *Sunaryo W, Nurhasanah, Rahman, Sugiarto A. 2017. Identification and characterization of Talas banana, a superior local cultivar from East Kalimantan (Indonesia), based on morphological and agronomical characters. Biodiversitas 18: 1414-1423.* Talas banana is a local cultivar grown in the certain area of East Kalimantan that is not explored and identified yet as other popular bananas such as Ambon, Raja, Kepok, Maulin, Susu and Cavendish. Based on the pre-observation, *Talas* Banana had a superior and unique taste compared to other commercial dessert and plantain bananas. The morphological and agronomical performance observation were carried out to investigate the possibility of Talas Banana developed as commercial and national excellent variety. *Talas* banana samples were collected and explored from four districts in East Kalimantan i.e. Samarinda, Kutai Kertanegara, Paser and East Kutai. The on spot morphological observation indicated that *Talas* banana is a combination of dessert and plantain suggesting a hybrid banana (*Musa acuminate* vs *Musa balbisiana*).Talas banana has characters possessed by *Musa Acuminata* as shown by the bract shape and color, male flower shape and color, and bud color, margin of the petiole canal,blotches color, and scars prominence. On the other hand, some other characters especially in fruit performance showed properties of plantain banana (*Musa balbisiana*) such as pedicle length, fruit apex shape and length, fruit shape, sugar and carbohydrate/starch content. Although based on the agronomical performance, Talas banana had low number of hands (7-11) and small fruit size resulting in lower production per hectar, it suggested to have important characters to meet commercial products such as long self-life, delicious taste, and high edible portion compared to other local commercial bananas. In conclusion, Talas banana is a potential cultivar to be developed as a superior and commercial variety.

Keywords: Talas banana, superior cultivar, *Musa acuminata, Musa balbisiana*, East Kalimantan

INTRODUCTION

Bananas are the most important fruit and serve major staple food for million people in the World (De et al. 2009). Most commercial and edible bananas are originated from two species of *Musa* spp. i.e. *Musa acuminata* (A-genome, 2n = 2x = 22), *Musa balbisiana* (B-genome, 2n = 2x = 22) and their interspecific triploid hybridscan be referred to as *Musa x paradisiaca* (Espino et al. 1992). Most triploid hybrids are plantains (AAB genotype) and other cooking bananas (ABB genotype). Almost all of commercial bananas are selected from the triploid hybrid plant for the seedless, vigorous, taste, shelf-life, fruit performance, and nutritional properties.

Indonesia is one of countries surrounded by the largest tropical rainforest in the world after Brazil (Seymor 2014). The humid-tropical rainforest covers part of Sumatra and almost all of Kalimantan and Papua Islands. Such forest contains a very high biological diversity of plants, animals, and other organisms including bananas. The biodiversity of banana in Kalimantan Island especially in East Kalimantan is still unknown, therefore efforts of exploration are very important for the banana breeding program to develop superior and commercial cultivars.

Bananas are cultivated and consumed by nearly 100 tropical and subtropical countries and has very important social and economic values in the world. In developing countries, bananas are the fourth important crop after rice, wheat and maize (INIBAP 2000). There are about 1,000 known cultivars of bananas (Heslop-Harrison and Schwarzacher 2007) and nearly 200 cultivars/clones are cultivated throughout the Indonesian archipelago (Valmayor et al. 2000). Bananas are very popular and widely consumed not only because of its delicious taste but also due to the high content of vitamins and minerals, especially vitamin A and C (Wall 2006).

The improvement of local fruit commodities as commercial products is one of the efforts to increase the competitiveness of such fruits in national and global markets. The local fruit has benefits in terms of the diversity of taste, aroma, color, and aesthetic aspects. Moreover, the local fruit commodities have a broad range adaptation on the growing regions that do not require high-input technology. Therefore, the development of the Indonesian local fruit commodities based on the development of adapted-local fruit centers is a promising strategy for the development of Indonesian agriculture,

especially in horticulture sectors that are recently still undeveloped optimally.

Talas Banana is a banana variant growing endemically on the Kalimantan Island which is not widely known as other commercial bananas such as Ambon, Kepok, Raja, Emas, Tanduk, Mauli or Barangan. Based on preliminary research, Talas banana has a good taste possessing excellent characters such as soft texture, sweet, not astringent or sour, low water content, and long shelf-life. In addition to good taste, Talas banana has also a unique and interesting physical characters such as yellow-orange/red pulpcolor and long-curved fruit apex. In local market, Talas banana shows a higher economic value represented by the higher price compared to other local bananas. In this paper, we report the results of the exploration and identification of Talas banana from East Kalimantan based on the morphological and agronomical characters as a preliminary effort in improving Talas banana as a national excellent and commercial variety.

MATERIALS AND METHODS

Site Visit

This study was conducted by field visit to the centers of Talas banana cultivation in East Kalimantan. The information of the cultivation centers was collected from several sources such as farmers, banana sellers, and from correlated agricultural institution. Based on the information, the site visit was focused to 4districts in East Kalimantan i.e. Samarinda, Kutai Kertanegara, Paser, and East Kutai (Figure 1). The observation, identification and observationwere conducted on spot centers of cultivation areasspread out in each district.

Morphological and agronomical identification

Several morphological and agronomical characters were observed for plant identification. For the characterization, 12 sample plants were identified for each research spot. Other important information such as number, type, origin of plant, local name, and location were also collected.

The whole plant and specific organ pictures such as leaves, pseudostem, male bud, suckers,bunch and fruit were taken using a Nikon Camera. The fruit characterization was conducted to investigate the fruit performance such as fruit color, fruit shape, fruit size, fruit productivity, peel and pulp thickness, percentage of edible part, nutritional content, and shelf-life of fruit at room temperature. The criteria of plant and fruit morphological characters used in this research were based on the "Guideline book to make a description and to test the correctness of horticulture plant varieties, Ministry of Agriculture, Republic of Indonesia, number: 700/Kpts/OT.320/D/12/2011 (in Indonesian) and "Descriptor for banana (*Musa* spp.)" (INIBAB, 1996).

Data analysis

The quantitative data such as plant height, pseudostem girth, leaf lamina length etc were calculated for mean values and standard deviation. The qualitative data were analyzed and characterized by comparing the similarity of samples with the descriptor.

RESULTS AND DISCUSSION

Plant distribution

Talas banana is cultivated in many ditricts in East Kalimantan including Samarinda, Kutai Kertanegara, Paser and East Kutai (Table 1), but only few of them were successfully explored and identified during the field visit. From 4 districtsexplored, 13 spots ofcultivation areaswere foundcomprising different number of clumps ranked from 332 to 153 clumps. The largest area of Talas banana cultivation was found in Paser districts, especially at the Muara Komam regencycomposed of 332 clumps from 3 spots of cultivated area. In total, it was observed 90 clumps from 13 spots of Talas banana cultivation in East Kalimantan (Table 1).

The distribution of Talas banana cultivation in east Kalimantan is influenced by the preference of the farmers, the economic value and the resistance to banana diseases mainly Bacterial and/or Fusarium wilt (Personal communication to the farmers). The economic value of banana is determined and indicated by the price in local market. Compared to the other local commercial cultivars, *Talas* banana is more preferred by local farmers due to the high price. Moreover, Talas banana is preferred by consumers because of its very good/delicious and unique taste (unpublished data). The most important factors influencing consumer preferences toward banana is quality (Dhamotharan and Selvaraj 2013). Fruit performance factors such as fruit taste, size and number of fruit per hand/fingers are considered the most important parameters influencing the consumer purchase in urban area, while appearances like color and shelf-life are considered less important (Ayinde et al. 2015).

Plant morphology

Most edible and modern bananas were derived from *Musa* spp. especially from the crosses of *Musa acuminata* (Genome AA) and *Musa balbisiana* (Genome BB) producing cultivated sweet and plantain bananas (Simmonds and Sheperd 1955). *M. acuminate* and *M. balbisiana* show significant differences of plant morphology. The characters of the ancestor/parents often appear in the modern cultivated bananas resulted from the crosses and could be detected using morphological observation. *M. Acuminata* has specific remarkable properties that could be recognized easily. *M. acuminata* is marked by brown or black blotches in pseudostem, erect or spreading margin canal petiole, downy or hairy peduncle, short pedicels, the roll back bract after opening, lanceolate/ovate bract shape, acute bract apex, prominent bract scars, and creamy white of male flower color(Simmonds and Sheperd 1955; D'Hont et al. 2012).On the other hand, *M. Balbisiana* possesses morphological properties such as no or few blotches on the pseudostem, inclosed margin of the petiole canal, not winged but clasping pseudostem, glabrous peduncle, long pedicels,

four irregular rows of ovules in each loculus, width/length ratio of bract shoulder usually low (more than 0.30), bracts do not reflex,broadley ovate bract shape, obtuse bract apex, scarcely prominent bract scars, a distinctive brownish-purple bract coloroutside, bright crimson inside, and male flower color variably flushed with pink (Simmonds and Sheperd 1955; Davey et al. 2013). These characters are remarkable at both species and easily observed to distinguish and identify the species.

Table 1. Talas banana cultivation in four districts of East Kalimantan, Indonesia

Explored districts	Number of observed spots	Number of clumps per spot	Total clumps observed
Samarinda	3	153	459
Kutai Kertanegara	5	202	1010
Paser	3	332	996
East Kutai	2	154	308
Total	13	841	2773

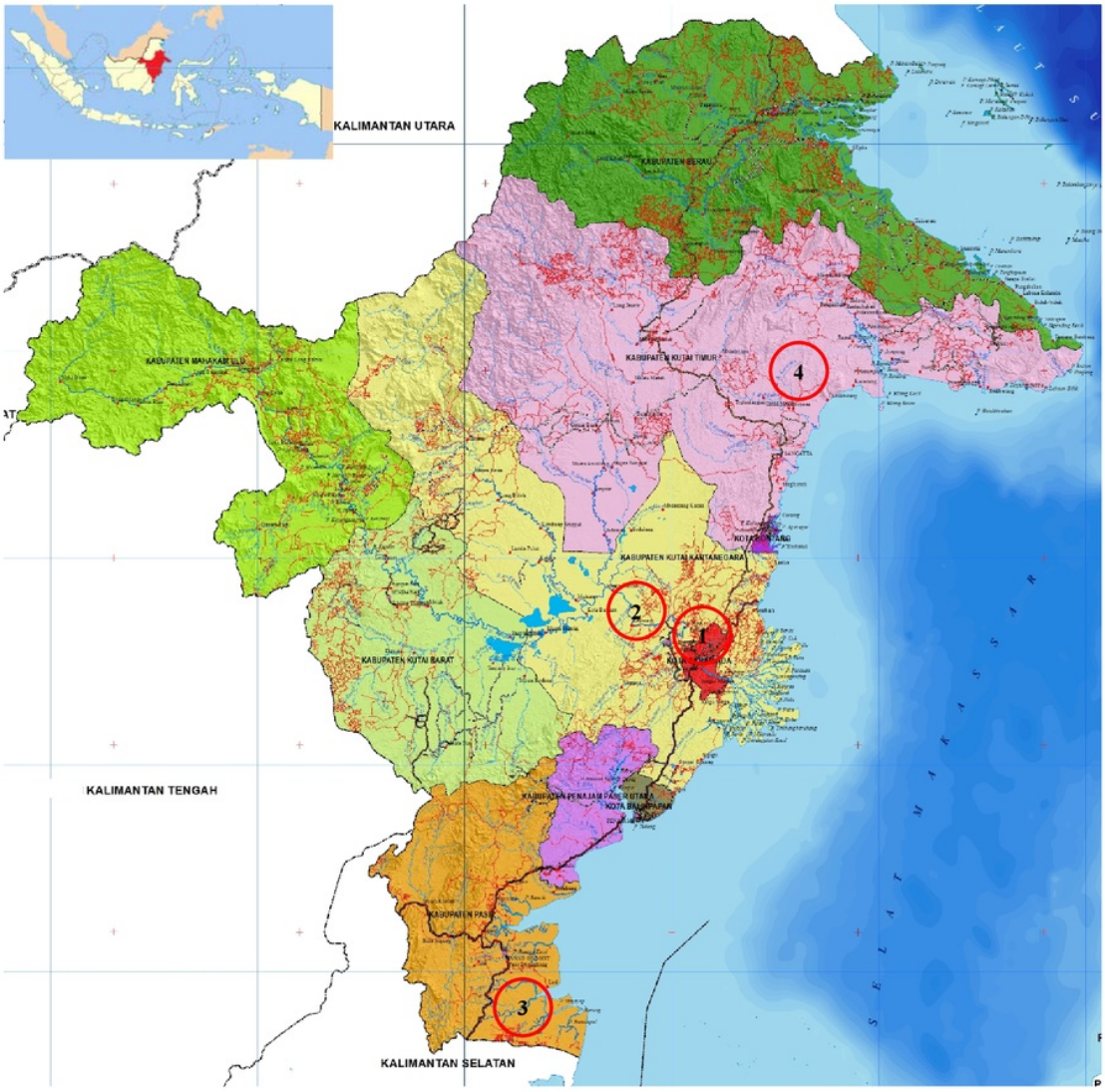

Figure 1. Research exploration sites of Talas banana in East Kalimantan Province, Indonesia. 1. Samarinda, 2. Kutai Kertanegara, 3. Paser, and 4. East Kutai

Morphological observation during site visit showed that Talas banana is very much closed to *Musa paradisiaca* (Simmonds and Sheperd 1955) derived from the crossing between *M. acuminata* and *M. balbisiana*. With plant height (pseudostem height) about 2.82 m as almost similar as to other local commercial bananas such as Ambon, Susu, or Raja bananas (Table 2, Figure 1A).*Talas* banana is grouped as a normal banana if it is classified based on the plant height and dwarfism. The height of cultivated banana is in the range of 2-9 m (INIBAB 2000). The pseudostem girth of Talas banana is slimy (53.13 cm) with dark-purple blotches color (Table 2, Figure 1B). The pseudostem blotches dominated by brown or black color is a remarkable character derived from *M. acuminata*. Among banana cultivars, the pseudostem morphology of banana possessed high variation in length and coloration (Pillay and Tripathi 2007).

The leaves emergence and growth of *Talas* banana is in intermediate shape (Not erect/not drop) with the leaf ratio (length:width) more than 3 : 1. *Talas* banana contains about 10 leaves which has 257.7 cm length and 72.3 cm width in average (table 2). The leaves has the green and not shiny color in upper and green-yellow on lower lamina (figure 3 A and B). The lamina base is *obtusus* (both sides pointed) which forms an *oblonge* type of leaf shape (figure 3 D) with a ratio of length and width 3.56 : 1. According to Nugroho (2003), the length and width ratio of leaves in *M. acuminata* is between 2.5-5 : 1 which accordingly will be categorized as an oblong type. Interestingly, the margin of leaf petiole shows a straight with erect margins indicating a *M. acuminata*-derived character (Table 2, Figure 3A). The cross section of petiole shows a U-shaped and a semi-hollow structure (figure 4A). This structure was as reported by Ennos et al. (2000) in *Musa textillis* and found in many other bananas (Sumardi and Wulandari 2010). The base of petioles forms a strong overlapping structure with a grey, green and dark purple color combination (Figure 3C).

The male bud is in a medium-slimy size and ovate/lanceolate shape with curly (rolling) *brachtea* after opening and before falling (figure 2D) emerging from the erect leave petioles(Figure 2C).The young bracts are greatly overlap to form a compact imbrication of male bud. These properties are *M. acuminata* belonging. On the other hand the bract internal facecolor is orange-red showing a *M. balbisiana*-derived property (Simmonds and Sheperd 1955).

The bunch is hanging slightly angled on the pseudostem and has green color with a spiral and dense (compact) fruit (Fable 2, Figure 2E). However, it was found that the fruit density and size were different between the initial harvest pant in the new opened cultivation land (Figure 4A) and those of in the continuous cropping land (figure 4B). The initial bunch usually contains fewer number of hands, but has bigger fruit size. It might be caused by their differences on the level of land fertility resulting in the different fruit productivity. As reported by Zhong et al. (2014) that banana continuous cropping results in the decline of the yield due to the decrease of soil quality as showed by increase of soil acidity, decrease of total organic C, accumulation of N, P, K, Ca and Cu, and deficiency of Mg, S, Fe, Mn, and Zn.

The peduncle is slightly hairy, dark green, with the length less than 30 cm. The rachis is falling vertically and the present flower and male bud may be degenerated or persistent with very prominent bract scars on rachis (table 2, figure 2C, D). These properties is also in line with the *M. acuminata* characters and in contrast to *M. balbisiana* posing a glabrous peduncle and scarcely prominent bract scars (Simmonds and Sheperd 1955; D'Hont et al. 2012).

The fruit is emerging and developing from the yellow-white flower and stand curved upward (obliquely, at a 45°angle upward) on the rachis. It is not like a sweet banana in general (*M. acuminata*-derived characters). Talas banana has fruit shape and properties like a plantain with a curved fruit shape, short pedicle and lengthily pointed long fruit apex (table 2, figure5A, B, C).These properties indicate a *M. balbisiana*-derived fruit shape. The pedicles are not fused and can be separated easily. The fruit size is classified in a medium size with 17.00 cm fruit length and 11.07 fruit girth. The interesting character of Talas banana is the persistentremains of flower relicts at fruit apex and the fruit does not peel easily (Table 2, Figure 5A, B, C), therefore the fruits have a longer shelf-life (20-24 days, table 3).

The immature fruit peel has light-green color(table 2, figure 2E) and when mature, the color is bright-yellow and waxy (table 2, figure 5A). The peel is classified as a thin peel with the thickness less than 2 mm. The color of fruit pulp is yellow bright with fourirregular rows of ovules in each loculus (Figure 5E, F). The mature fruits stand strongly on the pedicle without falling from hands (persistent). This property is much in contrast with other local cultivars such as Ambon, Mauli or Susu that can fall from the hands easily after certain time of maturity. The fruit flesh/aril shows seedless, soft texture, sweet and tasty properties. As a dessert and plantain, Talas banana can be cookedand also freshly eaten. These could be due to the starch (carbohydrates) content in the flesh is high enough as starch content as in common plantain cultivars. Compared to other local commercial bananas, Talas banana was preferred by consumers living in the surrounded cultivation areas in East Kalimantan because of the sweet, tasty and delicious taste (Personal communication to consumers). The seedless character indicates that Talas banana hasthe possible triploid structure of chromosomes resulted from the natural genetic modification such as crossing, and mutation/deletions orinsertions (Dolezel et al. 1994).

Table 2. Morphological characters of *Talas* banana identified based on the banana descriptor (INIBAB 1996).

Morphological characters	Descriptor	Note
Leaf habit	Intermediate	Not erect/not drop
Dwarfism	Normal	leaves not overlapped and leaf Ratio inferior to 2.5
Pesudostem height	2.1-2.9 m	2.82 ± 0.41 m
Pesudostem aspect	Slender	-
Pseudostem color	Green-yellow	-
Peudostem appearance	Dull (not shiny)	-
Pseodostem predominantcolor	Brown-purple	-
Sap color	Watery	-
Development of suckers	Between 1/4 and 3/4 of the height of the parent plant	-
Sucker Position	Close to parent (vertical growth)	-
Blotches at the petiole base	Small blotches	-
Blotches color	Brown-purple	-
Petiole canal leaf	Straight with erect margins	-
Petiole margins	Not winged and not clasping the pseudostem	-
Petiole margin color	Pink-purple to red	-
Leaf blade length [cm]	221 to 260 cm	257.70 ± 27.66 cm
Leaf blade width [cm]	≤70 cm	70.23 ± 5.83
Leaf ratio	≥3	3.68
Petiole length	51 to 70 cm	52.21 ± 22.67 cm
Color of leaf upper surface	Green	-
Appearance of leaf upper surface	Dull (not shiny)	-
Color of leaf lower surface	Green-yellow	-
Appearance of leaf lower surface	Dull (not shiny)	-
Wax on leaves	Few wax	-
Insertion point of leaf blades on petiole	Asymmetric	-
Shape of leaf blade base	Both sides pointed	-
Leaf corrugation	Even, smooth	-
Color of midrib dorsal surface	Green-yellow	-
Color of midrib ventral surface	White-green	-
Color of cigar leaf dorsal surface	Green	-
Peduncle length [cm]	≤30 cm	22.44 ± 12.43 cm
Peduncle width [cm]	≤6 cm	5.89 ± 1.32 cm
Peduncle color	Dark green	-
Peduncle hairiness	Slightly hairy	-
Bunch position	Hanging Slightly angled	-
Bunch shape	Spiral	-
Bunch appearance	Compact	-
Flowers that form fruits	Female (absence of pollens)	-
Male flower color	White-yellow	
Male bud type	Present	-
Male bud shape	Intermediate (Ovate)	-
Male bud size	≤20 cm	Small
Positioning of fruits on the crown	Uniseriate	-
Rachis type	Present and male bud may be degenerated or persistent	-
Rachis position	Falling vertically	-
Bract base shape	Small Shoulder	-
Bract apex shape	Slightly pointed	-
Bract imbrication	Young bracts greatly overlap	Like *Musa acuminata*
Color of the bract external face	Purple	-
Color of the bract internal face	Orange-red	-
Color on the bract apex	Color is uniform until apex	-
Color stripes on bract	Without discolored lines (not ridges) on the external face	-
Bract scars on rachis	Very prominent	-
Bract behaviour before falling	Revolute (rolling)	-
Wax on the bract	Moderately waxy	-
Presence of grooves on the bract	Not grooved	-

Fruit position	Curved upward (obliquely, at a 45°angle upward)	-
Number of fruits	13-16	16.00 ± 1.97
Fruit length [cm]	16-20	17.00 ± 0.44
Fruit shape	Curved	-
Transverse section of fruit	Rounded	-
Fruit apex	Lengthily pointed	Like plantain
Remains of flower relicts at fruit apex	Persistent style	-
Fruit pedicel length [mm]	≥21 mm	25,3 ± 0.35
Fruit pedicel width [mm]	5 to 10 mm	8.19 ± 0.23
Pedicel surface	Hairless	-
Fusion of pedicels	No visible sign of fusion	-
Immature fruit peel color	Light green	-
Mature fruit peel color	Bright yellow	-
Fruit peel thickness [mm]	≤ 2 mm	-
Adherence of the fruit peel	Fruit does not peel easily	-
Cracks in fruit peel	Without cracks	-
Pulp in fruit	With pulp	-
Pulp color before maturity	White	-
Pulp color at maturity	Yellow Goldish	-
Fruits fall from hands	Persistent	-
Flesh texture	Soft	-
Predominant taste	Sweet (*like Cavendish*) and tasty	-
Presence of seed with source of polle	Seedless	-

Figure 2. A. Talas banana plant, B. Pseudostem, C-D.. Male bud, D. Flower, and E. Bunch of *Talas* banana

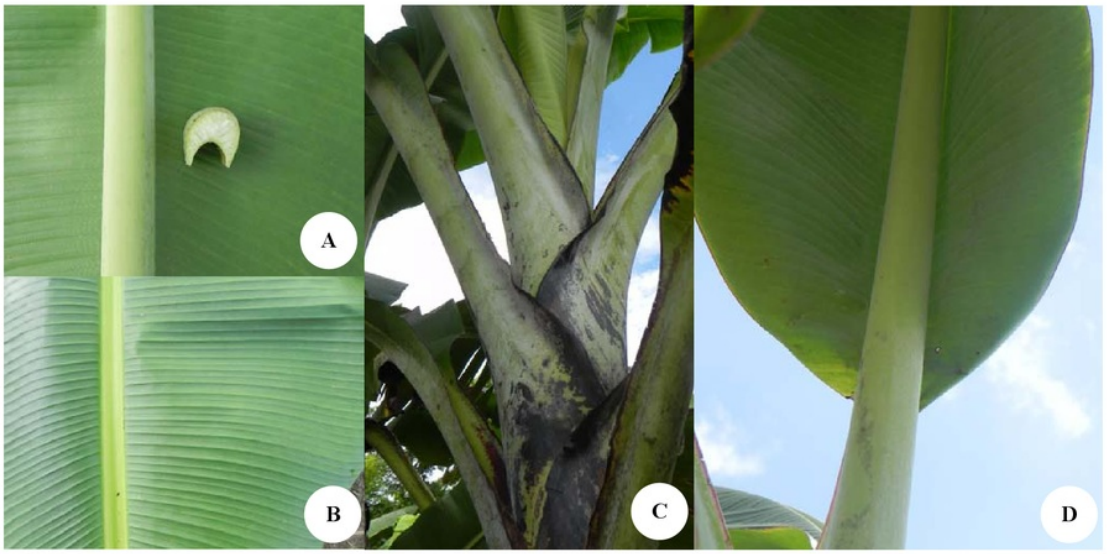

Figure 3. Leaves and petioles of Talas banana. A. Lower surface and petiole canal, B. Upper surface, C. Petiole arrangement in pseudostem and D. leaf base

Figure 4. Two different types of Talas banana bunches: A. banana bunch produced in a new opened lands plenty in soil nutrition, and B. Banana bunch grown in the continuous cropping lands

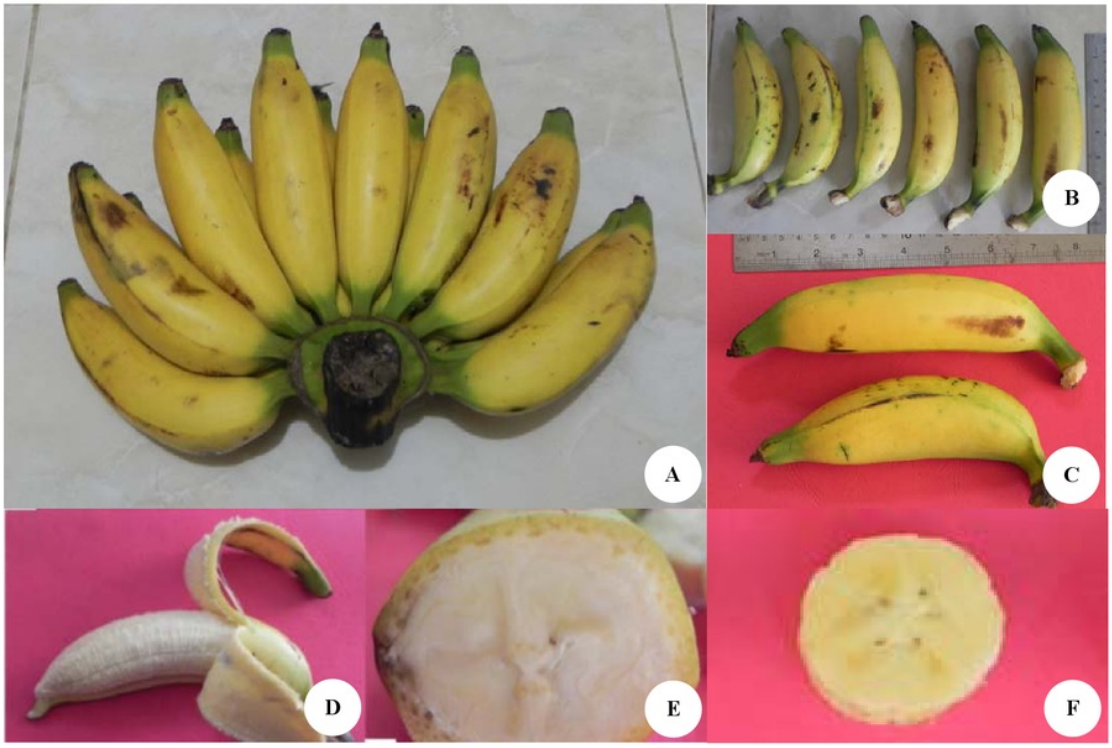

Figure 5. A. Talas banana hand, B-C. Fruits, D. Peeled fruit, E. Cross sectioned, F. Fruit

Plant agronomical performances

The observation of fruit productivity showed that with the traditional system of cultivation, *Talas* banana produced yield per hectare approximately 1500-2000 bunches or 16-23 t ha^{-1} per year indicating 1-2 bunches per clump per year with plant space 2 m x 3 m (table 3) with the population around 1660 clumps. In an intensive cultivation, banana cultivation in Southern Mindanau (Philipines) can produce 34 t ha^{-1}, but in average, banana in Philippines only produced 11 t ha^{-1}. On a poor nutrient management, banana production in Guangxi, China was 18 to 20 t ha^{-1} (Hongwei et al. 2004). Production banana is varied among the cultivation system, technology input system, and banana cultivars. The yield of banana is influenced by many factors such as environmental conditions, agronomic practices, the cultivars and ratooning management (Morton, 1987). If the innovation of cultivation technology especially the balanced land fertilization is applied, the yield could increase significantly. The application of N, P, and K fertilizer can increase the banana yield and reached 39 t ha^{-1} especially by producing more hands and increasing the single fruit weight (Hongwei et al. 2004).

Even though the number of hands per bunch of *Talas* banana was low (8-9 hands) but the number of single fruit per hand was relatively high approximately 16 fruit per hand (table 3). With the yield 1-2 bunches per clump per year, the production of *Talas* banana is categorized as low. The good and intensive cultivation of banana usually will result in 2-3 bunches per clump per year. The productivity of bunches of banana is closely correlated with the nutrient supply and management. The Giant Cavendish produced20-60 kg per bunch (in average 23 kg per bunch) or 1.5-2 carton and 2100 carton per hectare and 7-14 fingers (Broadley et al. 2014). Lady finger, a relative small banana, produced 10-30 kg per bunch (in average 13 kg per bunch) or 1 carton and 750 carton per hectare and 7-10 fingers (Broadley et al. 2014). The low yield of the observed plant production could be due to the application of low even zero input to the technology cultivation system especially the nutrient balanced technology. The uncontrolled sucker (ratoon) management was also the other practice contributing the low yield Talas banana. In the commercial Cavendish banana cultivation, the ratoon management was conducted by desuckering and remaining only 2 ratoons per clump besides the main plant (Broadley et al. 2004). Most farmers observed in this research were using a traditional system and do not apply the ratoon management technology for the Talas banana cultivation and maintained almost 4-5 suckers per clump (Unpublished data). Therefore, the resource (light, water, and soil nutrient) competition resulted in the low yield. The use of

intensive system such as balanced fertilization, weed control, soil tillage, and pest and disease control would also increase the yield significantly.

Beside morphological, nutritional, and agronomical characters, the shelf-life plays an important role in concerning to improve agricultural products like fruits as commercial commodities. Shelf-life determines the length/time of the product can be harvested, stored, transported, and used by consumers. Therefore, it also determines the economic value of such fruit product. Talas banana showed shelf-life about 20-24 days after harvesting (Table 3). It is also longer time compared to other local commercial cultivars such as Ambon, Susu, Raja, and Mauli (Unpublished data). Moreover, due to the thin fruit peel, Talas banana has very high edible portion around 72.45% (Table 3). These positive properties are preferable by consumers and contributing the high economic values.

Plant taxonomy

Most modern commercial bananas are derived from the two banana ancestor i.e. *Musa acuminata* and *Musa balbisiana* (McKey et al. 2010; Simmonds and Sheperd 1955; Heslop-Harrison and Schwarzager 2007). The natural crossing of both species (referred as *Musa x paradisiaca*; Simmonds and Sheperd 1955) and the genetic modification produces plenty variants of modern and edible bananas (called as domesticated bananas; Heslop-Harrison and Schwarzager 2007) possessing good characters such as sweet and seedless banana. Both of *M. acuminata* and *M. balbisiana* are diploids with genome AA (descending sweet/dessert bananas) and BB (descending plantain/ cooking bananas). Most domesticated bananas are triploids containing A and/or B genomes and classified into six variants/groupsAA, AAA, AB, AAB, ABB and ABBB (Simmonds and Sheperd 1955).

Table 3. The agronomical charactersof Talas banana based on 12 sample plants observed.

Agronomic characters	Mean ± SD*)
Plant height (m)	2.82 ± 0.41
Pseudostem girth (cm)	53.13 ± 8.60
Leaf number	10.00 ± 1.58
Leaf length (cm)	257.70 ± 27.66
Leaf wide (cm)	70.23 ± 5.83
Number of suckers (anakan)	10.03 ± 0.84
Fruit number per hand	16.00 ± 1.97
Number of hands	8.13 ± 1.88
Fruit length (cm)	17.00 ± 0.44
Fruit girth (cm)	11.07 ± 0.21
Tip length (cm)	2.40 ± 0.10
Petiole length (cm)	2.53 ± 0.35
Bunch weight (kg)	11.93 ± 3.34
Hand weight (g)	1466.60 ± 53.24
Fruit weight (g)	79.03 ± 13.56
Fruit aril weight (g)	57.26 ± 4.51
Edible portion (%)	72.45 ± 6.72
Production per hectar (bunches per year)	1500-2000
Production per hectar (ton ha^{-1})	16-23
Shelflife from the fisrst day harvesting (days)	20-24

Note: *) The value was calculated based on 12 sample plants observed. SD: Standard Deviation

The taxonomy status of Talas banana is still unclear and unidentified yet. But based on the morphology observation (Table 2 and Figure 2,3,4,5), most likely Talas banana is originated from the crossing of two species i.e.*M. acuminata* (AA genome) and *M. balbisiana* (BB genome) and possibly has triploids chromosome sets since the fruit pulp/flesh is sweet and has no seeds (seedless) (table 3). To investigate the genetic constitution of *Talas* banana needs further genomic analysis such as chromosome (flow cytometry for chromosome calculation) or molecular marker analysis.

In conclusion, morphological observation indicated that *Talas* banana is a combination of dessert and plantain suggesting a hybrid banana (*Musa acuminate* vs *Musa balbisiana*). *Talas* banana has characters possessed by *Musa acuminata*as shown by the bract shape and color, male flower and bud shape, male flower color, margin of the petiole canal, blotches color, and scars prominence. On the other hand, some other characters especially in fruit performance showed properties of plantain banana (derived from *Musa balbisina*) such as pedicle length, fruit apex shape and length, fruit shape, sugar and carbohydrate/starch content. Although, based on the agronomical performance, *Talas* banana had low number of hands (7-11) and small fruit size resulting in lower production per hectar, it suggested to have important characters to meet commercial products such as long self-life, delicious taste, and high edible portion compared to other local commercial bananas. In conclusion, Talas banana is a potential cultivar to be developed as a superior and commercial variety.

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