

Characterization of Pamelo Leaves (*Citrus maxima* (Burm) Merr) Aceh, Indonesia

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ABSTRACT

Pamelo (*Citrus maxima* (Burm.) Merr) is one type of orange that is prospectively cultivated in Indonesia. Pamelo in Indonesia is very diverse, as the skin of the fruit is green to red, some are with seed and seedless. Pamelo plants have diverse leaves, both in shape, size, lamina and thickness. The various leaf shapes between plants which show below the genetic resources of pamelo plants are numerous and varied. Information about pamelo aceh plants, especially about the character of leaves is still very limited. This information can be used to determine the characteristics of pamelo aceh so that later it will be very useful in classifying and grouping plants. The purpose of this study was to determine the character of the Pamelo Giri Matang leaf in Aceh, Indonesia. The study aims to see the level of diversity of pamelo in the village of Pante Lhong. The study was conducted in the village of Pante Lhong, Peusangan District, Bireuen, District, Aceh, Indonesia and at the Laboratory of Agroecotechnology, Faculty of Agriculture, Universitas Malikussaleh, from September to November 2017. The sample plants used were 15, aged between 10 and 25 years. The research was conducted using descriptive method with sampling by purposive sampling method. Observations were carried out quantitatively and qualitatively based on Descriptors for Citrus (PGRI). The results showed that Pamelo Giri Matang Aceh Indonesia was an evergreen plant with an intensity of green to dark leaf color. The average leaf lamina has a length of 14.62 cm and a width of 7.04 cm with an average area of 59.74 cm². The most commonly found leaf wings are obovate.

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1. INTRODUCTION

Pamelo (*Citrus maxima* (Burm.) Merr) is a type of orange that is prospectively cultivated in Indonesia, including Aceh. Pamelo in Indonesia is very diverse, as the skin of the fruit is green to red, with seed and seedless (Susanto et al, 2011; Rahayu, 2012). Pamelo also has a variety of flavors, some are sweet but some are bitter, the skin is easy to peel and some are not easily peeled.

Likewise, with leaves, pamelo plants have a variety of leaves, both shape, size, lamina, and thickness (IPGRI, 1999). The diverse leaf shape between plants shows that the genetic resources of pamelo plants are numerous and varied. Pamelo leaves are ovoid to oval (Susanto, Rahayu, Tyas, 2013; Rai et al, 2015).

Information about pamelo aceh plants, especially about the character of leaves is still very limited. This information can be used to determine the characteristics of pamelo aceh so that later it will be very useful in classifying and grouping plants. The purpose of this study was to determine the character of the Pamelo Giri Matang leaf in Aceh, Indonesia.

2. MATERIALS AND METHODS

The study was conducted from September to November 2017. The sample plants were from Pante Lhong Village, Peusangan District, Bireuen District, Aceh, Indonesia. The analysis was conducted at the Laboratory of Agroecotechnology, Faculty of Agriculture, Universitas Malikussaleh. The sample plants used were 15, aged between 10 and 25 years. The tools used are knives, altimeter guard, meters, analytical scales, and cameras.

The research was conducted using descriptive method with sampling by purposive sampling method. Observations are carried out quantitatively and qualitatively based on Descriptors for Citrus (PGRI, 1999).

3. RESULTS AND DISCUSSION

3.1 Leaf Character

Vegetative life cycle of the leaves of the pamelo Giri Matang Aceh plant is an evergreen with a simple leaf division.

Pamelo plants never drop their leaves together in certain seasons, but leaves that fall because they are old. The intensity of green color of leaf blades is two, namely medium and dark and almost a draw between the two types. Leaf color variegation is not found on the leaves of

the pamelo Giri Matang plant. Leaf lamina are brevipetiolate in which petiole is shorter than leaf lamina (**Table 1**).

Table 1. Leaf Characteristics of Pamelo Giri Matang Aceh, Indonesia

Akresi	Vegetative life cycle	Leaf deviation	Intensity of green color of leaf blade	Leaf color variegation	Leaf lamina attachment
Giri Matang PLTD-01	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLTD-02	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLTD-03	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLTD-04	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLTS-1	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLTS-02	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLTS-03	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLTS-04	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLDP-01	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLDP-02	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLDP-03	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLDP-04	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLIG-01	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Giri Matang PLIG-02	Evergreen	simple	Dark	Absent	Brevipetiolate
Giri Matang PLIG-03	Evergreen	simple	Medium (green)	Absent	Brevipetiolate
Dominant	Evergreen	simple	Dark	Absent	Brevipetiolate

3.2 Character of Leaf Lamina

Pamelo Giri Matang leaves have an average length of 14.62 cm lamina, where the shortest is 13.33 cm long and 16.16 cm longest. The width of the lamina leaves between 6.48-7.99 cm with an average width of 7.04 cm. The average area of lamina is 59.74 cm² with a ratio of 2.11 cm. Pamelo Giri Matang leaves are between 0.27-0.36 mm with an average thickness of 0.34 mm (**Table 2**).

The length of pamelo leaves can reach 15-20 cm with a width of 8.5-12 cm (Rai et al., 2015). Leaf area affects photosynthesis results and reflects the area of

photosynthesis. The wider the leaf, the easier it is to get sunlight for photosynthesis.

Leaf lamina shape found in the pamelo Giri Matang there are three types namely elliptic, ovate and obovate with the most dominant elliptic form. Leaf lamina margins are found in two forms, namely crenate and entire. Pamelo Giri Matang leaf apex leaves are almost all menirus shaped (**Table 3**). Various forms of lamina of pamelo Giri Matang leaves are shown in Figures 1, 2 and 3.

Table 2. Character of Leaf Lamina Pamelo Giri Matang Aceh, Indonesia

Akresi	Leaf lamina length	Leaf lamina Width	Ratio Leaf lamina length/Width	broad lamina leaves	Leaf thickness	Leaf lamina shape	Leaf lamina margin
	----- cm -----			--cm ² --	-- mm --		
Giri Matang PLTD-01	14.84	6.99	2.12	59.28	0.35	Elliptic	crenate
Giri Matang PLTD-02	13.33	6.52	2.04	50.47	0.38	Elliptic	crenate
Giri Matang PLTD-03	15.44	6.55	2.35	56.07	0.35	Ovate	crenate
Giri Matang PLTD-04	15.78	7.87	2.01	71.81	0.36	Elliptic	crenate
Giri Matang PLTS-01	13.93	6.67	2.10	52.98	0.27	Elliptic	entire
Giri Matang PLTS-02	16.15	7.95	2.32	73.03	0.36	Elliptic	Entire
Giri Matang PLTS-03	15.60	7.99	1.96	77.28	0.31	Elliptic	crenate
Giri Matang PLTS-04	14.26	7.15	2.00	59.52	0.31	Elliptic	crenate
Giri Matang PLDP-01	14.01	6.48	2.17	51.55	0.29	Elliptic	crenate
Giri Matang PLDP-02	14.45	6.70	2.19	54.88	0.33	Ovate	entire
Giri Matang PLDP-03	14.69	6.90	2.14	59.01	0.34	Elliptic	entire
Giri Matang PLDP-04	15.46	7.80	2.00	67.76	0.32	Ovate	crenate
Giri Matang PLIG-01	13.37	6.49	2.07	51.81	0.35	Obovate	crenate
Giri Matang PLIG-02	13.81	6.59	2.11	52.25	0.35	Ovate	crenate
Giri Matang PLIG-03	14.25	7.01	2.05	58.37	0.38	Elliptic	crenate
Average/Dominant	14.62	7.04	2.11	59.74	0.34	Elliptic	crenate

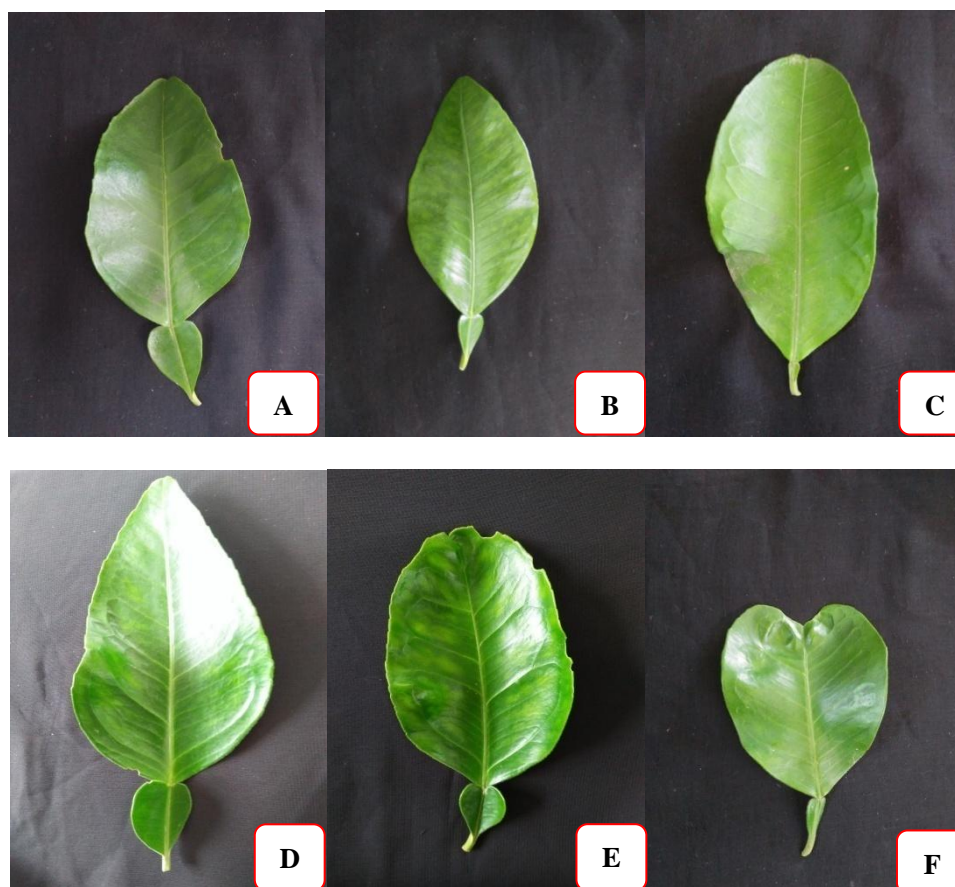


Figure 1. Character of Leaf Lamina Pamelos Giri Matang Aceh, Indonesia. Elliptic (A); ovate (B); Obovate(C); Lanceolate (D); Orbicular (E); Obcordata (F).



Figure 2. Character of Leaf Lamina Margin Pamelos Giri Matang Aceh, Indonesia.entire (A.); Crenate (B).

3.3 Shape of the Petiole Leaf

There are three basic forms of petiole wings, including obcordata, obdeltate, and obovate and the most common is obovate. However, many also found the obcordata and obdeltate leaf stalk wings (Table 4). Nambangan and Sri Nyonya type Pamelos which have an average wing shape obcordata (Hardiyanto et al, 2007). The wings of the pamelos petiole are of average medium size, but compared to other types of citrus, pamelos leaf wings are the broadest (Ortiz, 2002). The shape of the wing of the petiole leaf and the mid between the strands and the wing of the leaf can be seen as in **Figure 3**.

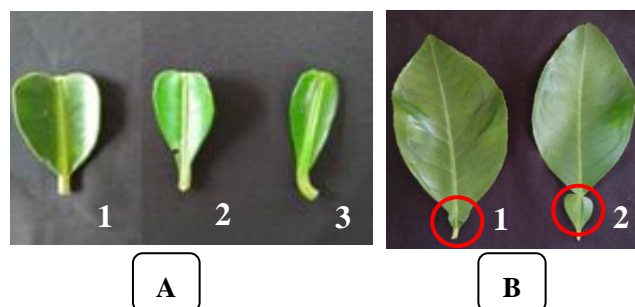


Figure 3. Character of Petiole Wing Shape Pamelos Giri Matang Aceh, Indonesia. A. 1.) obcordata, 2.) obdeltate; 3.) obovate); and B: Junction Between Petiole and a Lamina: 1.) fused; 2.) articulate

Tabel 3. Character of Petiole Leaf Pamelo Giri Matang Aceh, Indonesia

Aksesi	Absence/presence of petiole wings	Petiole wing width	Petiole wing shape	Jungtion between petiole and lamina
Giri Matang PLTD-01	present	Medium	Obovate	articulate
Giri Matang PLTD-02	present	Medium	Obovate	articulate
Giri Matang PLTD-03	present	Broad	Obovate	articulate
Giri Matang PLTD-04	present	Medium	Obcordata	articulate
Giri Matang PLTS-01	present	Medium	Obovate	articulate
Giri Matang PLTS-02	present	Medium	Obdeltate	articulate
Giri Matang PLTS-03	present	Narrow	Obovate	articulate
Giri Matang PLTS-04	present	Broad	Obdeltate	articulate
Giri Matang PLDP-01	present	Narrow	Obovate	articulate
Giri Matang PLDP-02	present	Medium	Obovate	articulate
Giri Matang PLDP-03	present	Medium	Obovate	articulate
Giri Matang PLDP-04	present	Medium	Obdeltate	articulate
Giri Matang PLIG-01	present	Narrow	Obovate	articulate
Giri Matang PLIG-02	present	Broad	Obdeltate	articulate
Giri Matang PLIG-03	present	Medium	Obcordata	articulate
Dominant	present	Medium	Obovate	articulate

4. CONCLUSION

Pamelo Giri Matang Aceh Indonesia is an evergreen plant with an intensity of green to dark leaf color. The average leaf lamina has a length of 14.62 cm and a width of 7.04 cm with an average area of 59.74 cm². The most commonly found leaf wings are obovate.

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