SOME MORPHOLOGICAL AND ECOLOGICAL FEATURES OF MAY CHA *(Pseudosasa amabilis)* IN DIEN BIEN PROVINCE

Le Xuan Truong
Vietnam National University of Forestry

SUMMARY

The study was conducted in Muong Phang, Pa Khoang communes, Dien Bien district and Pu Nhi commune, Dien Bien Dong district, Dien Bien province. Four 500 m^2 (20 m x 25 m) plots were set up in three communes that have May cha naturally distributed in secondary rehabilitation forest and plantation. May cha is *Pseudosasa amabilis* or *Pseudosasa amabilis* (McClure) Keng f.ex S.L.Chen & et al. It belongs to Pseudosasa genus, Arundinarieae tribus, Bambusoideae subfamilia, Poaceae familia, Poales order. It is a mixpodial bamboo. May cha in four plots had various growth indicators such as D_{00}, Height, and morphological features and were much lower than that in the past. It showed that May cha in the survey area were degraded. In the survey areas May cha grew in IIIA1 secondary rehabilitation forest and Acacia plantation with natural regeneration that had crown closure from 0.3 to 0.8. The soil depth were from 70 to 92 cm, A and AB horizon were from 26 to 55 cm. Soil colors were black brown- yellow, black brown- red yellow, and black brown- red brown. Soil were relative moisture to moisture that had silt texture, granular structure, and porous to compaction. In the depth of 40cm (distribute horizon of May cha's rhizome, stump, and root) soils had bulk density from 1.01 to 1.20; particle density from 2.52 to 2.74; porosity from 53.12 to 60.72%; humus content from 3.01 to 4.00%; Labile NH_4^+ from 1.56 to 2.09 mg/100gr soil; Labile P_2O_5 from 0.08 to 0.13 mg/100gr soil; Labile K_2O from 2.62 to 3.93 mg/100gr soil; pH_{KCl} from 5.6 to 5.9; and pH_{H2O} from 6.0 to 6.2.

Keywords: Ecological feature, May cha, morphological feature, Pseudosasa amabilis, secondary rehabilitation forest.

I. INTRODUCTION

May cha *(Pseudosasa amabilis)* distributes naturally in the forest in Dien Bien Province. In past decades, it culms were collected to export to Europe countries as fishing rods and snow skating sticks because it is strait, elastic, and durable. Then when it stopped exported to Europe, local people did not pay attention on this bamboo until recent years when Usui Company (a Japanese Company) collects and exports its culms to Japan for agricultural purpose. Local people have explored May cha culms from natural forest that makes the material source for May cha culm processing factory of Usui Company is unstable, low quality, and inadequate. In future, this can cause degradation of May cha resource in the area. For developing the business of the Company and Sustainable Natural Resource Management it is necessary to develop plantation of May Cha as material supplying for the Company. In fact, there has been a little knowledge on this species, especially on the biological and ecolgical features of this species. This survey supported by Management Board for Forestry Projects - Sustainable Natural Resource Management Project with the purpose is to have initial idea for establishing sustainable source for May cha culm processing factory of Usui Comapany in Dien Bien Province.

II. STUDY AREA AND METHODS

2.1. Study area

Three communes: Muong Phang commune, Pa Khoang commune in Dien Bien district, Pu Nhi commune in Dien Bien Dong district, Dien Bien province were selected to implement the survey.

Plot No.	Location	Coordination (USA)	Survey date
1	Keo village, Pa Khoang	E00305046 N02370873	14/01/2017
2	Pa Tra village, Pa Khoang	E00303219 N02376241	15/01/2017
3	Yen 1 village, Muong Phang	E00306441 N02375240	16/01/2017
4	Nam Ngam A, Pu Nhi. DBD	E00308301 N02364659	18/01/2017

2.2. Method

Interviewed local people (one people in each village) and people in Usui company (one technical assisitant and one worker) to have general information about May cha in the survey area such as distribution area, state of May cha in the past, cultivating, exploiting, and processing experiences.

Established 4 temporary typical plots (500 m^2 (20 m x 25 m)) in the area to survey on the forest conditions/plantation types that have May cha distribution. Measure DBH, height of all timber tree in the plot and use Gap Light Analysis Mobile Application to measure crown closure of plot.

In each plot, set up 5 sub-plots (2 m x 2 m) to survey the growth of May cha such as D_{00}, Height and collected morphological features of this species. 30 samples for each feature.

In each plot dug a soil profile to describe and collected soil samples in the depth from 0 to 40 cm for analysing physical and chemical properties of the soils where May cha distributes in the lab. Soil samples were analysed in Soil Laboratory of the Center for Experiments and Practices of Silviculture Faculty, Vietnam National University of Forestry.

Data was processed by using Microsoft Office Excel soft ware.

III. RESULTS

Identify bamboo species

Through interviewing people in Usui factory and observing in the field, the bamboo that were collected by the factory May cha has Latin name *Pseudosasa amabilis.* Other name is *Pseudosasa amabilis* (McClure) Keng f.ex S.L.Chen & et al. It belongs to Pseudosasa genus, Arundinarieae tribus, Bambusoideae subfamilia, Poaceae familia, Poales order. It is a mixpodial type that has axillary buds on the stem base of the mother bamboo which develop into rhizome and extends horizontally underground. The axillary buds on the rhizome nodes develop into new scattered stems. Meanwhile axillary buds on these new stem base develop into shoot and form a dense bamboo brush. It incorporates the features of both monopodial and sympodial types.

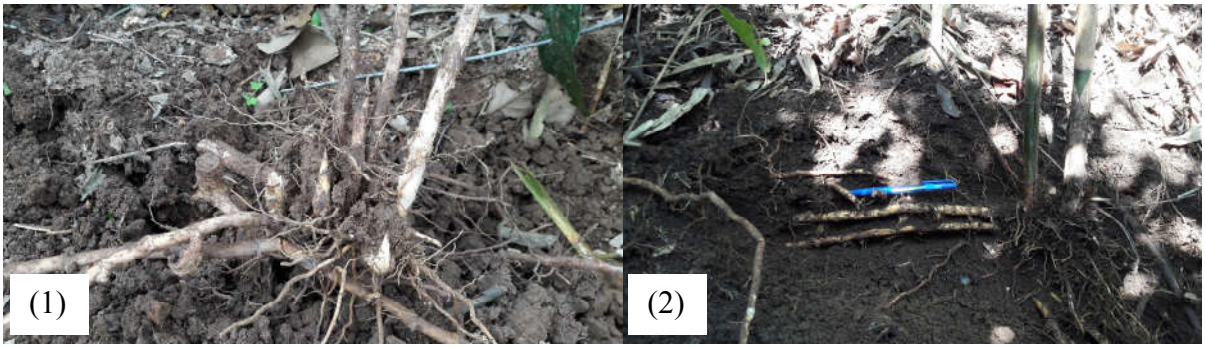


Fig. 1, 2. May cha rhizome in Keo village, Pa Khoang commune

(Photo by Truong, December 2016 and January 2017)

Biological features

Table 1. Growth of May cha in the area

Plot	D_{00} (cm)				Hvn (m)				Location
	Min	Mean	Max	SE	Min	Mean	Max	SE	
1	0.25	0.67	1.00	0.02	0.35	1.14	2.03	0.04	Keo village, Pa Khoang
2	0.30	0.87	1.20	0.02	0.45	1.56	3.50	0.09	Pa Tra village, Pa Khoang
3	0.20	0.48	1.00	0.02	0.16	0.67	1.51	0.05	Yen 1 village, Muong Phang
4	0.25	1.44	2.00	0.03	0.50	2.40	5.00	0.08	Nam Ngam A, Pu Nhi. DBD

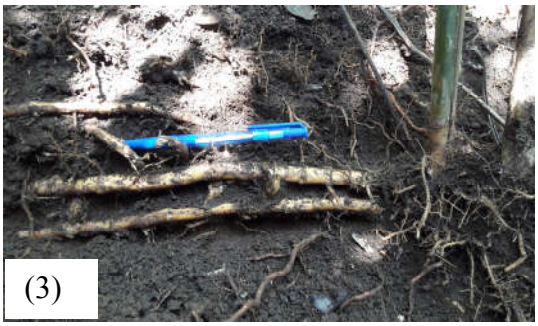
In Pa Khoang commune mean diameter base of May cha is 0.67 cm to 0.87 cm. The maximum diameter base is from 1.00 to 1.20 cm. Mean height is from 1.14 to 1.56 m, maximum height is from 2.03 to 3.50 m. These values are higher than that in Yen 1 village, Muong Phang commune, but lower than in Nam Ngam A, Pu Nhi commune, Dien Bien Dong.

When interviewing local people we know that in the past May cha in Pa Khoang commune grew much better than now. It mixed with timber tree in the forest with low to medium crown closure. Now May cha is degraded because people do not pay attention on it. They collect shoot, cut the culm in natural forest, even cut and burn May cha in their shifting cultivation area.

Table 2. Some morphological characteristics of May cha

Contents		Min	Mean	Max
Rhizome	D (cm)	0.43	0.78	1.08
	L internode (cm)	2.30	3.46	5.00
Internode	D (cm)	0.20	1.07	2.20
	L (cm)	6.00	22.21	43.00
Leave	Wide (cm)	0.70	1.74	3.05
	L (cm)	5.50	12.14	22.50
	Base (cm)	3.70	5.74	8.00
Sheath	Wide (cm)	1.40	5.72	8.40
	L (cm)	3.30	12.84	25.00
	Apex (cm)	1.00	3.92	7.50

Rhizome of May cha in the area has diameter ranges from 0.43 cm to 1.08 cm, mean 0.78 cm. Length internode is from 2.30 to 5.00 cm, mean 3.46 cm. Culm internode have diameter from 0.20 cm to 2.20 cm, mean 1.07 cm, culm internode length from 6.00 cm to 43.00 cm, mean 22.21 cm. Leave wide from 0.70 to 3.05 cm, leave length from 5.50 cm to 22.50 cm, and the leave base is from 3.70 to 8.00 cm. Sheath wide is from 1.40 cm to 8.40 cm, sheath length is from 3.30 to 25.00 cm, and sheath apex is from 1.00 to 7.5 cm.


(3)


(4)


(5)


(6)

Fig. 3, 4, 5, 6. May cha Rhizome, leaves, branch and sheath

According to http://www.midatlanticbamboo.com/ May cha has maximum height of 50', maximum diameter of 2.5''. It is described as Perennial. Rhizomes elongated; leptomorph; scaly. Culms 600 – 1300 cm long; 30 – 57 mm diam. Culm-internodes is 24 – 48 cm long; Branch complement three. Culm-sheath blade lanceolate; deciduous; 9 – 18 cm long; 8 – 20 mm wide. Leaf-blades lanceolate; 15 – 35 cm long; 15 – 35 mm wide. *(http://www.kew.org/data/grasses-db/www/imp08701.htm).*

May cha in the survey has low growth to compare with the document mention above and also lower than in the past according to the interview results.

Ecological characteristics

The survey area has elevation from 880 m to 1,635 m with Medium Mountain and valley topography. The slope is from 20^o to 35^o.

Survey area has tropical monsoon climate with two distinct seasons:

+ Rainy season from April to November: high humidity, hot, and rain.

+ Dry season from November to March next year: dry and cold, coldest is from December to January next year.

Mean annual temperature is 22,3^{o}C, absolute highest temperature is 26.3^{o}C, absolute lowest temperature is 3^{o}C.

Mean annual rainfall is from 1,600 mm to 2,000 mm; lowest rainfall is 20 to 30mm/month in December and January next year. Highest is about 400mm/month in July and August.

Prevailing wind are North East in winter and South East in summer. In March and April there is Lao wind (hot and dry).

Table 3. Habitat of May cha in the survey

Plot	Condition	Crown closure	Note
1	III A1 Secondary rehabilitation forest	0.3 - 0.4	Pa Khoang, Dien Bien district
2	III A1 Secondary rehabilitation forest	0.7 - 0.8	Pa Khoang, Dien Bien district
3	Acacia plantation with natural regeneration	0.3	Muong Phang, Dien Bien district
4	III A1 Secondary rehabilitation forest	0.5	Pu Nhi, Dien Bien Dong district

May cha distributed in secondary rehabilitation forest in Pa Khoang commune with the crown closure is from 0.3 to 0.8. May cha was severely affected by local people and livestock. In Muong Phang it was more effected that make May cha become small and even useless. In Pu Nhi, May cha grew well and met the requirement from Usui factory.

Soils in the area developed from magma acid and metamorphic rock such as granite, shale, and schist.

The most popular soil in the area is Ferralsols developed on the medium mountain: Distributed at the elevation from 950 m to 1,600 m, mean slope more than 25^{o}, medium texture and high in organic content.

Alluvium soil distributes along the lake and streams at the elevation lower than 950 m, lower slope with the soil depth from medium to thick, soil texture from silt to sandy, loamy soil.

The soil types in the area are: Humus reddish yellow soil in magma acid (Ha); Reddish yellow in magma acid (Fa); Alluvium soil (D), and some other soil such as Yellowish red develop on shale (Fs), light yellow humus soil develop on sand stone (Hq), and humus yellowish red develop on schist. These soils occupy small area and distribute on the top of the mountain.

(*Pa Khoang People Communal Committee, land use inventory of Pa Khoang commune, Dien Bien district, Dien Bien province, 2015).*

Table 4. Soil profile description

Plot	Soil depth (cm)	A – AB horizon	Color	Humidity	Structure	Compaction	Texture
1	92	20 - 44	Black brown-Yellow	Relative moisture-Moisture	Granular	Porous to compaction	Silt
2	70	40 - 55	Black brown-Yellow	Relative moisture-Moisture	Granular	Porous to relative compaction	Silt
3	90	18 - 32	Black brown- Red yellow	Relative moisture-Moisture	Granular	Porous to compaction	Silt
4	75	16 - 26	Black brown- Red brown	Relative moisture-Moisture	Granular	Porous to compaction	Silt

The soil depth in the area is from 70 to 92 cm. A, AB horizon is lowest in plot 4 in Pu Nhi commune. In Pa Khoang A, AB horizons are from 44 to 55 cm, and have black color. In the time of the field survey the soil is relative moisture to moisture. Its structure is granular,

its texture is silt and porous to compaction. According to local people, the soil in the area is still good for May cha to grow.

Soil profile in Keo village	Soil profile in Pa Tra village	Soil profile in Yen 1 village	Soil profile in Nam Ngam A village
(7) 	(8) 	(9) 	(10) 

Fig. 7, 8, 9, 10. Soil profiles in the survey area

Table 5. Soil analysis result from lab

Profile	Bulk density (g/cm^3)	Particle density (g/cm^3)	Porosity (%)	Humus content (%)	Labile nutrients (mg/100gr soil)			pH KCl	pH H_2O
					NH_4^+	P_2O_5	K_2O		
1	1.06	2.58	58.98	3.12	2.08	0.13	3.91	5.8	6.1
2	1.07	2.52	57.61	4.00	2.09	0.08	2.62	5.9	6.1
3	1.01	2.57	60.72	3.26	1.57	0.10	3.93	5.8	6.2
4	1.20	2.55	53.12	3.46	1.57	0.11	3.92	5.6	6.0

The samples were collected at the depth from 0 to 40 cm (in the root zone of May cha, observed in the site). The bulk density ranged from 1.01 to 1.20, particle ranged from 2.52 to 2.74. The porosity ranged from 53.12% to 60.72% meanwhile the humus ranged from 3.01 to 4.00%. Labile NH_4^+ ranged from 1.57 to 2.09mg/100gr soil; P_2O_5 ranged from 0.08 to 0.13 mg/100gr soil; and K_2O ranged from 2.62 to 3.93 mg/100gr soil. pH_{KCl} ranged from 5.6 to 5.9; pH_{H20} ranged from 6.0 to 6.2. These soils are still good for May cha to grow but it is necessary to have experiment on the effect of fertilizer to May cha growth to have the optimum growth of May cha.

This species can tolerate minimum temperature: -3°F. Does best in full sun. Spreading: Aggressive. (http://www.midatlanticbamboo.com/bamboo-frames/bamboo-0129.htm).

May cha prefers an open loam of fair quality and a position sheltered from cold drying winds. Succeeds on peaty soils. Requires abundant moisture and plenty of organic matter in the soil. Moderately cold resistant, but can be badly damaged in cold winters. Plants are said to tolerate temperatures down to about -10°C. This species is notably resistant to honey fungus. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die. *(http://practicalplants.org/wiki/Pseudosasa_amabilis).*

III. CONCLUSSION

May cha (*Pseudosasa amabilis)* is a mixpodial bamboo that belongs to Pseudosasa genus, Arundinarieae tribus, Bambusoideae subfamilia, Poaceae familia, Poales order. May cha in four plots had various growth indicators and were degraded. May cha grew in IIIA1 secondary rehabilitation forest and Acacia plantation with crown closure ranged from 0.3 to 0.8. High crown closure can decrease May cha density. May cha distribute in the deep, relative moisture to moisture soil with the medium to good soil.

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MỘT SỐ ĐẶC ĐIỂM HÌNH THÁI, SINH THÁI LOÀI MẠY CHẢ *(Pseudosasa amabilis)* TẠI TỈNH ĐIỆN BIÊN

Lê Xuân Trường

Trường Đại học Lâm nghiệp

TÓM TẮT

Nghiên cứu tiến hành tại xã Mường Phăng, xã Pá Khoang huyện Điện Biên và xã Pú Nhi, huyện Điện Biên Đông, tỉnh Điện Biên. Bốn ô tiêu chuẩn (OTC) điển hình, tạm thời 500 m^2 (20 m x 25 m) được lập ở 3 xã có Mạy chả phân bố tự nhiên trong rừng thứ sinh phục hồi và rừng trồng. Mạy chả có tên khoa học là *Pseudosasa amabilis* hay còn có tên đầy đủ là *Pseudosasa amabilis* (McClure) Keng f.ex S.L.Chen & et al. Mạy chả thuộc chi Sặt, họ phụ Tre trúc, họ Hòa thảo, lớp Một lá mầm. Mạy chả là loài cây có thân ngầm mọc phức hợp. Trong 4 OTC các chỉ tiêu sinh trưởng của Mạy chả có biến động rất lớn về đường kính gốc, chiều cao và các chỉ tiêu hình thái khác; các chỉ tiêu này đều nhỏ hơn so với trước kia. Điều đó chỉ ra rằng Mạy chả trong khu vực đã bị thoái hóa. Trong khu vực nghiên cứu Mạy chả mọc trong rừng thứ sinh phục hồi trạng thái IIIA1 và rừng trồng Keo tai tượng có tái sinh tự nhiên với độ tàn che từ 0,3 đến 0,8. Độ sâu tầng đất từ 70 đến 92 cm, tầng A và AB từ 26 đến 55 cm. Màu sắc đất từ nâu đen - vàng, nâu đen - vàng đỏ và nâu đen - đỏ nâu. Độ ẩm từ hơi ẩm đến ẩm, với thành phần cơ giới thịt, kết cấu hạt, độ xốp từ tơi xốp đến chặt. Ở độ sâu đến 40 cm (tầng phân bố của gốc, thân ngầm và rễ Mạy chả) đất có dung trọng từ 1,01 đến 1,20; tỷ trọng từ 2,52 đến 2,74; độ xốp từ 53,12 đến 60,72%; hàm lượng mùn từ 3,01 đến 4,00%; NH_4^+ dễ tiêu từ 1,56 đến 2,09 mg/100gr đất; P_2O_5 dễ tiêu từ 0,08 to 0,13 mg/100gr đất; K_2O dễ tiêu từ 2,62 đến 3,93 mg/100gr đất; pH_{KCl} từ 5,6 đến 5,9; và pH_{H2O} từ 6,0 đến 6,2.

Từ khóa: Đặc điểm hình thái, đặc điểm sinh thái, Mạy chả, Pseudosasa amabilis, rừng thứ sinh phục hồi.

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