DOI: 10.17165/TP.2017.3.3

WIRAEKHA KANJANASIRI[1]

The Knowledge Transfer on Morphology and the Usefulness of Red Guava Tree "Pharankrang" to Samokae Community, Maung District, Phitsanulok Province

The aims of this research were (1) to study morphology and usefulness of "Pharangkrang", (2) to maintain this plant, (3) to transfer this knowledge to Samokae community (SC) by workshop CIPP Model Project and (4) to evaluate this project. It has been studied by observation, by reviewed literature, and compared with manual guide botanical book. It was maintained in laboratory, too. The knowledge was transferred to 34 persons by lecturing and training. The results show, that the local name of this tree is" Pharangkrang" in SC, while the scientific name is Psidium guajava. It is dicotyledon plant, that grows about 2 meters high. The stem is brownish gray, the leave is simple, oval shape without stipule, rough, entire margin and rather dark red. The two pairs of leaves are decussate. The netted vain is red, the pink flower is solitary, perfect, regular and complete flower. The ovary is in inferior receptacle. The fruit is simple, typical beery, round, small, dark red with smell, but the interior is pink. Seeds are strong, small and no food collection. In Thailand it has become a decoration plant because of its beauty. Herbarium and pickled green are used to keep it. 10 branches castration have grown in SC. Overall of this project it is in the high level (X=3.88, S.D=0.62).

1. Introduction

Surveying in Samokae Community (SC), Maung District (MD), Phitsanulok Province (PP), Thailand, there was only one red guava plant grown up on Mr. Suwan Aemsai's land. The tree is 20 years old. It is a beautiful tree due to its red leaves, red branches, and dark red fruits. It has grown up from propagative branch, because his relative gave him as a present. The tree was from Tungsaleum Community in Sukhothai Province. It is only one tree in this community and has never spread to other community. The local name in SC is "Pharangkrung". The word "Pharang" means guava and "Krang" means dark red. The owner has never reproduced it, because he doesn't know how to do it. At the present, there are 2 red guava fruits being sold in Thailand, (hybrid form) the fresh fruit is used for food and the branches look beautiful. However, people in SC want to learn about the tree and do the propagation in order to grow them and sell fresh fruits to earn more income in the future. Therefore, researchers were

[1] Ph.D, Post Doc., Assist. Professor; Phitsanulok University, Department of Research Affair and Northern Tak College, Thailand; *dr.wireka@gmail.com*

interested in studying morphology and propagation of this plant and transferring this knowledge to SC and to others.

Research Objectives

(1) to study the morphology and the usefulness of red guava tree ”Pharangkrang”.
(2) to maintain the Pharangkrang tree
(3) to transfer the knowledge about tree morphology, marketing and community enterprise of Pharangkrang to SC and others by workshop of CIPP Model project.
(4) to evaluate this project after knowledge transferring

2. Literature review

In all dynasty of guavas there are 3 species: 1) the exocarp is green, but the interior is fresh white 2) the exocarp is green, but the interior is pink. It is ordinary Pink guava (Jambu merah) 3) the exocarp is dark red and the interior is red. It is Red Malaysian guava. Red guava trees are in Thailand (for example 1,2). It came from Philippines in 2519 B.E. It has grown up on the land in Suanpakgad garden palace, Ayuthya road, Bangkok, which is mainly from the flowering plant garden tree of Thailand association at that time. It is decorative plant, with small-sized fruit, thin with many amounts of seed. Pomegranate Siam guava tree is breeding plant between the developed red guava tree from Philippines (Dang Bangkok variety) and Bangkok Apple variety. This hybrid is more than 30 years old. The fruit is round and large-sized, about 1-kilogram weight. The interior is red, thick, hard, sweet smack, not astringent and very delicious. Red Bangkok guava (Ripe Red, Psidium guajava) is breeding plant between pomegranate Siam guava tree and Pansrithong guava tree done by Damrongsak. This trunk of hybrid is red. The upper part of leave is green-black, but the lower part is red-brown. The flower is red-pink and very beautiful. The young fruit is brown-black. The ripe fruit is brown-red. The interior of fruit is red with sweet smack. Its shape looks like Vietnam guava fruit. It gives many fruits. This hybrid is done by Damrongsak.[2]

NIOTTM and Chieng Mai Universty (CMU, 1999) reported in the book of “Identification of Medicinal Plants Special Vol.” that guava is in the Family Myrtaceae. Its identities are: medicinal plant, simple leave, opposite pair of leaves, dry, sticky, resemble the leather, oil gland in addition, but no stipule. Many stamens and one pistils are in simple flower. Style of stamen is slender long. Ovary is in receptacle. According to the researches of Orwa et al., (2009), guava

[2] http://www.specialtyproduce.com/produce/Red Malaysian_Guavas_9 -11-2016

is shrub plant, it is 3-10 meters high, brownish red color and slender long stem, opposite pair of leaves and elliptical in shape, obtuse apex and truncate base of leave. Netted vains were clear. Flower is white, solitary attached on the lateral branch. There were 2-3 flowers in one cluster in some varieties. Fresh fruit is pyriform or ovoid berry (500g weight). Ecocrop (2015), Orwa et al. (2009) and Soetopo (1991) report that guava fruits are yellowish orange, but some fresh fruits may be white, yellow, pink and red color. Ripe fruits are deep sweet and smell. Ripe red guava fruits were derivative food, such as juice, sauce and yam in South America. Branches are used for skewers. The color from bark is used for dying. It is decoration plant in Thailand because it looks beautiful.

The idea of CIPP Model is composed of cortex (C), input (I), process (P) and product (P). Boonprasert, Uthai (2005) reports if there are good and efficient plans for C and I and best practice is followed, then good results are expected.

3. Research methodology: material and method

Materials: herbarium, chemical substances, microscope with photography camera, computer and manual guide botanical book.

Method:

(1) to study the morphology of the ”Pharangkrang” by observation within and without microscope and with photography camera, such as common name, scientific name, stem, leaves, flowers, fruits , seed, color, smell and taste, take photography, then compare to manual guide botanical book

(2) to study the usefulness of Pharangkrang tree by literature review

(3) to maintain Pharangkrang tree by herbarium and pickled green in laboratory

(4) to transfer the knowledge on morphology, marketing and community enterprise to the people in SC and BC through lecturing do propagation through training by workshop CIPP model project. (Figure 1)

Figure 1: Transfer the knowledge to the people in SC and BC through lecturing and training

(5) to evaluate this project that comprise of 4 aspects: cortex, input, process and product by qualified 5 rating questionnaires as a research tool for 34 respondents.

(6) (Scores 5 = highest, 4 = high, 3=moderate, 2=low, 1= lowest)

(7) Data are analyzed by statistic in terms of average mean (x), standard deviation (S.D) and compared them in standard criteria.

Score		**Level**
4.50 – 5.00	=	highest
3.50 – 4.49	=	high
2.50 – 3.49	=	moderate
1.50 – 2.49	=	low
1.00 – 1.49	=	lowest

(8) The goal of the research is that the castrate branches grow in SC and BC. (Duration of the research: February-December 2016)

4. Results and discussion

The local name in Samokae of the red guava tree is ”Pharangkrang”. The scientific name is Psidium guajava. It is dicotyledon plant, about 2 meters high. The stem is brownish gray color. (Figure 2)

Figure 2: Pharangkrang and the stem

It is simple leave, no stipule, rough, and rather dark red color. It is in oval shape, entire margin, obtuse apex and truncate base. The 2 leaves are opposite, and the pairs of leaves are decussate. The netted vain is red color. There are 4 levels in structural leave. Flower is solitary, perfect, regular and complete flower on the receptacle. The upper of 5 sepals are pink and the lower are greenish red color. 5 petals are pink and aren't connected to each other. The multiple stamens are not connected to each other and bend to inside while it is delicate flower. The filaments are long and pink color. The pistil is pink color and the ovary is in inferior receptacle. The fruit is simple, round and small. The delicate and ripe fruits are dark red color, smell and typical berry type. The external pericarp of this fruit is dark red color but the mesocarp connected with endocarp are pink. About 70-80 strength seeds are small, round, light brown and no food collection. The color from bark is used for dying. It is decorative plant in Thailand because it looks beautiful (http://www.specialtyproduce.com/produce/Red Malaysian_Guavas_9 -11-2016 (Figure 3)

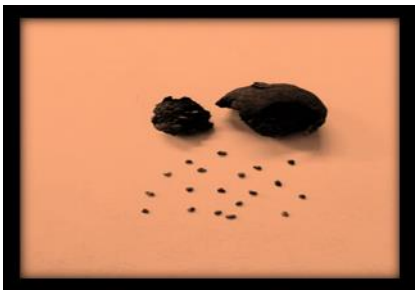
a) leaves

b) flower

c) pink flowers

d) leaves and fruits

e) half of fruit



f) seeds

Figure 3: Pharangkrang and its leaves, flower, fruit and seeds

Herbarium and pickled green are used to keep it in laboratory. (Figure 4)

Figure 4: Herbarium and pickled green preservation of Pharangkrang

These knowledge on morphology of Pharangkrang, the marketing and the community enterprise have been transferred to SC and BC through lecturing. The method of reproduction has been done through training by workshop CIPP model project. The results show that, branches castration have grown in BC and SC on land of the owner of Pharangkrang tree. It shows that the samples' skill is not sufficient. Next the samples reproduce the Pharangkrung tree for 10 branches castration. (Figure5).

Figure 5: Branches castration of Pharangkrang have grown in BC and SC

This project has evaluated. The sample included 34 persons in SC and BC. There were 26 males (76.47%). The oldest men were 40-60 years old (8.82 %). Most of them were (24) farmers (70.58 %). The results indicate that overall of this project is in the high level. (X=3.88, S.D=0.62) and overall of every aspect is, too. This is the series of means from the highest to the lowest. First, the cortex of this project (X=4.00, S.D=0.65), second input (X=3.99,S.D=0.73), process (X=3.80,S.D=0.80) and the lowest mean is the product aspect (X=3.74, S.D=0.92). It shows that there are good plan, good preparation, and good practice. These are effects to the product. (Table1) Related to Boonprasert, Uthai (2005) reports, that if there are good and efficient plans and best practice is followed, then good results are expected.

aspects	X	S.D	translation	order
1. Cortex	4.00	0.65	high	1
2. Input	3.99	0.73	high	2
3.Process	3.80	0.80	high	3
4.Product	3.74	**0.92**	**high**	4
Average mean	**3.88**	**0.62**	**high**	

Table 1: The workshop CIPP Model project

5. Suggestions

Researchers should advise people Pharangkrang reproduction until produce many fruits to sell and produce derivative food until they can set community enterprise for these. We should research further on medicinal use of Pharangkrang in the future. We believe in the success of this research was supported by the scholarship from the Office of the Higher Education

Commission, the network researches by lower North Naresuan University. We say many thanks for this.

REFERENCES

Boonprasert,Uthai (2005)) *Curriculum and School Academic Administration*. Bangkok.: Samjareunpanit.

Ecocrop (2015) *Ecocrop database*. FAO, Rome, Italy.

National Institute of Thai Traditional Medicine and Faculty of Pharmacy,Chieng Mai Universty(CMU)(1999) *Identification of Medicinal Plants Special Vol*. Bangkok. The War Veterans Organization of Thailand.

Orwa, C.; Mutua, A.; Kindt, R.; Jamnadass, R.; Anthony, S., (2009) *Agroforestree Database: a tree reference and selection guide. version 4.* Kenya. World Agroforestry Centre. Kenya.

Soetopo (1991). *Psidium guajava* L. Record from Proseabase., Verheij, E.W.M. ; Coronel, R.E.(Eds). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. (http://www.specialtyproduce.com/produce/Red Malaysian_Guavas_9 -11-2016)