Varietal Specificities of Tea Plant in the Tropics

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Tea plant varieties can be roughly classified into two types: one is the China type which represents the varieties of the temperate zones and the other is the India type which is the representative of the tropical varieties.

However, there are many intermediate types with miscellaneous forms as the result of natural free crossing which is caused by the fact that the chromosome number of any species of tea plant is destined to be n=15. Moreover, it is rather difficult to make correct taxonomy of the varieties because of their continuous variation of characters.

Watt (1907) made a detailed study of the Indian tea plant and gave it the scientific name of *Camellia thea* Link classifying it into four varieties. Stuart (1919) indicated some faults on this classification by Watt and re-named the tea plant as *C. theifera* (Griffith) Dyer. He classified it into four other varieties and the merit of this classification is in the regional grouping of varieties.

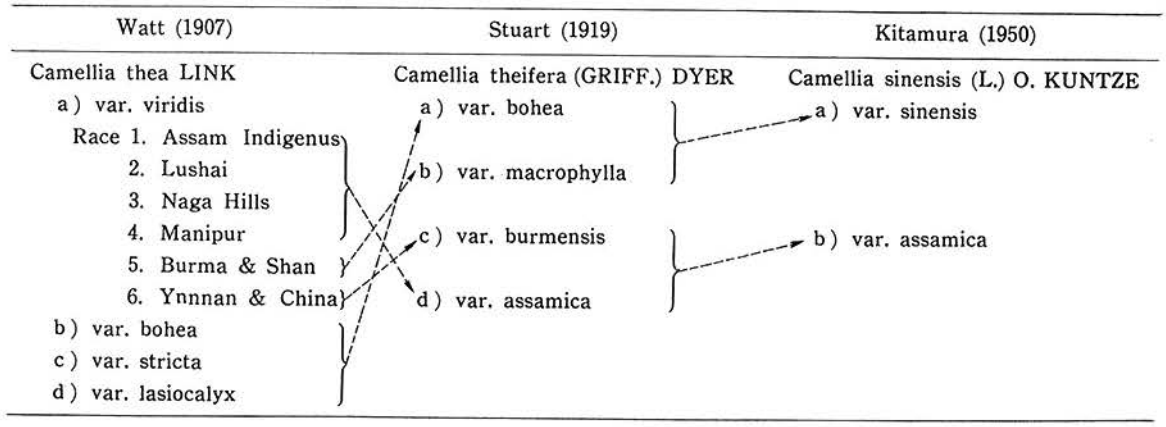
Furthermore, Kitamura (1950) proposed to term the tea plant as *C. sinensis* (L.) O. Kuntze and classified it into two varieties. Table 1 shows these classifications in comparison with each other.

The author has studied the tea plants of Asia in order to find out their origin from the morphological viewpoint. The diversity of the tea plant in the tropics and the difficulty of varietal discrimination between the China (var. *sinensis*) and India types (var. *assamica*) will be described.

Tea plants grown in China

Tea plant cultivation in China commenced in ancient days. Therefore it is acknowledged that the Chinese tea plant had been maintained in pure line without any crossing with other strains.

Table 1. Taxonomical classification of tea plant



The tea plant which is distributed in the area from east China to Japan is the var. *sinensis* of small-leaved form and is called the China type tea.

Besides the tea varieties of the Chinese mainland, some wild tea plants exist abundantly in the mountainous and hilly regions of Formosa (Taiwan). Table 2 shows the specific characters of the leaves of such wild tea plant. Kitamura identified it as var. *sinensis*.

Tea cultivation in Formosa began with the introduction of seeds from Mt. Wuyi in Fukien province between 1796 and 1820 and this species showed no morphological difference compared with the Japanese varieties.

Among the tea species of the wild type grown in the mountainous regions of central Formosa, the one found at Mt. Meiyuan (1,835 meters above sea level) gives an aspect of primeval forest containing many tree types of which the height is more than 10 to 15 meters. The leaves of these trees are very large compared with those of the hilly lands (Lienhuachih, Yuchih, etc.).

The shape of this kind of leaf is oblong or oblanceloate with acuminate tip and 11 pairs of lateral veins are on one leaf.

The leaf of the tea plant grown in the hilly lands is smaller than that of the mountainous regions and only eight pairs of lateral veins exist in each leaf. Generally the shape of this leaf is eliptic and narrow.

The tea plant grown in Hainan Island is almost similar to that of the hilly lands in Formosa and it is generally larger and has more lateral veins than the China type leaves.

Tea plants grown in Burma and Thailand

The major tea producing district of Burma is Shan State and it is followed by Mogok area of Kachin State in upper Burma. The cultivation area of North Shan is the largest in Burma. Namhsan is the biggest production center of this area and wild tea plants are also abundant in its surrounding jungles. This wild tea plant possesses the specificities of the Shan type (var. *burmensis*) ; that is, the leaves are large, the trees are arborescent and the tree which is more than five meters in height is not rare in this district.

The tea cultivation method of this district is rather primitive for the tea plantations have been left under natural conditions. Consequently, many bushes grow up to the height of nearly two meters and the vigor of the bushes is lost because of the injuries of several plant pests.

The leaf shape of the cultivated tea plant is almost eliptic with miscellaneous size. Table 3 shows the standard type.

A new tea plantation was set up in 1959 in Kutkai province which is situated near the Yunnan border area of China.

Most of the seeds used for this plantation were brought from Namhsan and others were introduced from the Salween Valley (the Salween River passes near Kutkai and the seeds produced there are those of the wild plant) and Bhamo of Kachin State. The leaf size of the Kutkai tea plant is generally larger than that of Namhsan.

Table 2. Leaf characters of the tea plant in China

District	Growing State	Leaf Length (cm)	Leaf Width (cm)	Length / Width	Number of Veins	Note
Pinchen, Taiwan	cultivated	7.6±0.29	2.5±0.08	3.1±0.05	6±0.15	Introduction (Fukien)
Mt. Meiyuan, Taiwan	wild	16.7±0.40	4.8±0.16	3.5±0.06	11±0.23	
Lienhuachih, Taiwan	wild	10.7±0.31	3.8±0.15	2.8±0.04	8±0.17	
Yuchih, Taiwan	wild	10.4±0.26	3.9±0.08	2.7±0.13	8±0.17	
Mt. Shuisheta, Taiwan	wild	11.4±0.24	3.8±0.11	3.0±0.09	8±0.21	
Liukuei, Taiwan	wild	10.7±0.16	3.6±0.12	3.0±0.08	8±0.23	
Mt. Chim, Hainan	wild	11.6±0.49	4.1±0.13	2.8±0.13	8±0.37	Herb., Tokyo Univ.

Table 3. Leaf characters of the tea plants in Burma and Thailand

District	Growing State	Leaf Length (cm)	Leaf Width (cm)	Length / Width	Number of Veins	Note
Irrawaddy, Kachin	wild	11.9±0.60	4.4±0.11	2.7±0.16	9±0.40	
Tanghpre, Kachin	cultivated	13.8±0.63	5.0±0.24	2.7±0.08	9±0.24	Naturally grown
Chindwin, Kachin	wild	13.7±0.51	5.1±0.13	2.6±0.06	9±0.25	
Namhsan, Shan	cultivated	10.4±0.67	4.6±0.24	2.2±0.07	9±0.16	
Kutkai, Shan	cultivated	12.6±1.04	5.1±0.44	2.4±0.05	9±0.80	
Kutkai, Shan	cultivated	18.2±0.09	7.4±0.25	2.5±0.05	9±0.50	Naturally grown
Muang, Khu, Thailand	wild	13.6±0.58	6.3±0.28	2.2±0.04	10±0.36	

The village of Pinlaung which is located on the plateau rising 1,300 meters above sea level between Kalaw and Loikaw in south Shan is well known for producing high quality tea. The seed of the tea plant cultivated in this village was introduced from Namhsan. Its leaf shape is roundish eliptic and the leaf size is small as that of the China type.

Wild tea plants are also found in the Kachin State districts along the Irrawaddy and Chindwin rivers. There are newly planted tea plantations in the suburbs of Tanhpre and Myitkyina which are located near the confluence of the Irrawaddy. The leaf size of the Kachin State tea is not much different from that of north Shan but the leaf shape of the former is generally narrow eliptic.

The tea yield in Thailand is not so large so that it could be listed as one of the main industries of the country. Wild tea plants are distributed in the northern mountainous regions and in the north-eastern areas along the Mekong River. Formerly there were some tea plantations is the old towns of Chiengmai and Chiengrai in northern Thailand. The Meo and Yao tribes, the non-Thai races, who lived in Laos or Thailand, have used these tea leaves as "Miang (chewing tea)" from ancient days. Recently some of the Oolong and black tea are produced in Thailand. The leaf shape of these tea plants is almost similar to the tea leaf of Burma. It is generally roundish eliptic.

Tea plants grown in India

India ranks first in tea production of the world. Its yearly output amounts to 402,700 ton. This corresponds to 32.5 per cent of the world's production.

Some 72 per cent of the whole cultivated tea areas in India are located in the extent from Darjeeling of the Himalayas to Assam State and others are distributed in southern India of which the cultivation center is at Nilgiris (1,200–1,800 meters above sea level) which is situated 60 miles distant in the north from Coimbators. The varieties of the tea plant cultivated in India were once almost the same as that of Japan because the China type seed was introduced first. But the India type is being substituted gradually for the China type.

In Assam district, which is the largest tea production center in India, the tea industry enterprise is carried on through cultivation, production and marketing under the general controlling management by Estate in the areas from the Bramaputra terrace lands to the north-east border and in the Cachar area surrounding the town of Silchar. The Assam type tea plant is the representative of the India type which contains Assam (var. *assamica*), Naga and the Shan types. The Assam tea plant was found by R. Bruce in 1823. Thereafter, the Indian wild tea was discovered in Naga, Manipur and Lushai Hills.

Since the wild tea plants had possessed some different morphological characters according to the dissimilarities of native lands, the taxonomy of Indian tea plants, including the comparison with the China type tea, was very much complicated owing to the difference of classifications held by many botanists. Miscellaneous varieties of the tea

Table 4. Leaf characters of the tea plant in India

District	Growing State	Leaf Length (cm)	Leaf Width (cm)	Length / Width	Number of Veins	Note
Rangapara, Assam	cultivated	14.4±0.72	5.7±0.72	2.5±0.06	10±0.27	
Darrang, Assam	cultivated	14.8±0.88	6.9±0.30	2.1±0.07	10±0.28	
Tinsukia, Assam	cultivated	16.7±0.52	7.8±0.25	2.1±0.04	12±0.29	Naturally grown
Jaipur, Assam	cultivated	20.4±0.70	8.2±0.31	2.5±0.05	12±0.26	
Jorhat, Assam	cultivated	19.2±1.78	9.6±0.10	2.1±0.19	11±0.34	Standard variety
Jorhat, Assam	cultivated	14.8±0.77	4.1±0.26	3.6±0.10	8±0.42	Naga type
Titabar, Assam	cultivated	11.5±0.45	4.4±0.28	2.7±0.11	9±0.30	

plant are now cultivated in the Assam districts. Some botanists believe they are the hybrids of the China type.

Table 4 shows the leaf characters of the Assam tea plant. The two Jorhat varieties in the table are cultivated on the genus Camellia specimen farm at the Tea Research Association of Tokeai Experiment Station. One of them is the standard variety of the Assam type and the other is the Naga type which is the wild tea plant grown in Naga Hills. The leaf of the standard Jorhat variety is similar to the Darrang and Tinsukia varieties in shape which is roundish eliptic though the size is different. The Tinsukia variety originated in the regions between Sibsagar, the native place of var. *assamica* discovered by R. Bruce, and Sadiya where var. *assamica* was cultivated. Furthermore, the Tinsukia variety is the first source of tea seed in the Assam district. Therefore the Jorhat variety is one of the pure var. *assamica*. The character of the Naga type tea plant is quite similar to that of the Formosa wild tea and Titabar tea to that of the Shan type of Burma. As for the number of lateral veins of leaf, the Naga type has nine to 12 pairs of vein, indicating also the wide variability of the Assam variety as well as in the size and shape of the leaf.

Tea plants grown in Ceylon

Tea cultivation in Ceylon started at the Peradeniya Botanic Garden with the seed introduced from Assam in 1840, and tea production gradually developed replacing coffee from 1867.

Ceylon's tea cultivation areas are located almost on the plateau which is more than 900 meters above sea level in the central mountainous region. Kandy is the largest tea production center, followed by Nuwaraeliya and Batdull. The variety of the tea plant cultivated in Ceylon is almost similar to the Assam type.

Recently, tea yield augmented twice as much as the output of old days because the technics of cutting propagation came into wide use and selected varieties were spread.

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