



MORPHOLOGICAL DIVERSITY OF LAM DONG TEA (VIET NAM)



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Introduction

Tea (*Camellia sinensis* (L.) O. Kuntze) is an allogamous plant and all tea taxa freely interbreed therefore tea plants with many overlapping morphological, biochemical and physiological attributes are highly diverse and consequently their populations are very heterogeneous. Because of the extreme cross pollination, existence of the pure archetypes of tea is doubtful. In tea cultivation, its primary recommended propagation method – asexual propagation – would be over time expected to be the cause of further reduction in genetic diversity. Assessing the diversity in tea provides the basic information for tea breeding aiming to build up a set of regionally adapted tea populations and clones.

Materials and methods

Table 1. List of evaluated *Camellia* species and the number of samples. The taxonomic classification used was based on Cohen-Stuart (1919) (cited by Yamamoto *et al.*, 1997)

Taxa	Local name of sample
<i>C. sinensis</i> var. <i>bohea</i> (Small-leaved China tea)	Yabu, KT, NT, TQ
<i>C. sinensis</i> var. <i>shan</i> (Shan tea)	LD97, TB14, TBCD, TB11, St
<i>C. sinensis</i> var. <i>assamica</i> (India tea)	PH1
Hybrid between India and China teas	LDP1, LDP2
Unknown (new promising clones)	No. 1 to No. 19
Total	31

Thirty-three main characteristics of stem, the 4th leaf, young (P+2) shoot and flower were investigated qualitatively and quantitatively following IPGRI's guidelines (1997). Tannins content in (P+2) shoots was also analyzed. The mean values and standard deviations of each characteristic were calculated. UPGMA dendrogram was formed with NTSYS 2.1.

Results

Reported vegetative characteristics overlap and show a continuous variation (Table 2).

Conclusions

Investigated teas at Lam Dong showed high diversity based on their morphological characteristics. China, India and Shan teas were clearly separated by cluster analysis and commercially grown cultivars within each group were morphologically similar. A larger diversity was observed in new promising clones which broaden the diversity observed in the established groups (Figure 1).

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A corner of tea plantation at Lam Dong province



Young tea shoots, harvested part of tea plant



The splitting of style is an important and trustable characteristic to differentiate tea plants.

Table 2. Variability in vegetative and reproductive characteristics of investigated teas at Lam Dong province

Characteristics	Range of variation
Stem	
Stem circumference (cm)	18.8 (1.9) – 100.8 (3.7)
Stem shape	round – other
Height of the first branching position (cm)	4.8 (0.8) – 30.0
Branch angle to stem (degree)	7.0 (2.0) – 70.6 (3.8)
Branching ability	few – many
Height of plucking surface (cm)	68.6 (2.6) – 135.0
Length of plucking surface (cm)	58.4 (2.7) – 320.0
Breadth of plucking surface (cm)	70.0 (7.9) – 200.0
Leaf	
Leaf length (cm)	5.9 (0.6) – 13.3 (0.6)
Leaf breadth (cm)	2.6 (0.2) – 5.7 (0.3)
Leaf size	rather small – large
Leaf length/breadth ratio	1.92 – 3.33
Leaf shape	ovate – lanceolate
Leaf angle to branch (degree)	47.6 (3.2) – 84.3 (2.2)
Leaf pose	semi-erect – horizontal
Leaf color	light green – purplish
No. of pair of main vein on leaf surface	5.6 (0.5) – 12.1 (1.0)
No. of pair of serrulation on leaf margin	23.9 (1.5) – 64.7 (2.4)
Serrulated form	regularly acute – irregularly blunt
Length of leaf pedicle (cm)	0.18 (0.03) – 0.57 (0.08)
Length from leaf pedicle to first serration (cm)	1.4 (0.1) – 2.7 (0.2)
Posture of leaf base	attenuate – rounded
Shoot	
Pubescence density on bud	nil - dense
Pubescence density on lower surface of 1 st leaf	glabrous – dense pubescence
Shoot color	light green – purplish
Shoot length (cm)	5.6 (0.4) – 13.1 (0.6)
Fresh shoot weight (g)	0.33 – 1.10
Dry shoot weight (g)	0.07 – 0.26
Fresh/Dry ratio	3.0 – 5.8
Tannins content (% DW)	15.23 – 28.56
Flower	
Flower color	white
Number of petal	4 – 6
Style	3-equal splitting styles – 3-unequal splitting styles
Flowering ability	few – many

Note: numbers in the parentheses are standard deviation values.

References

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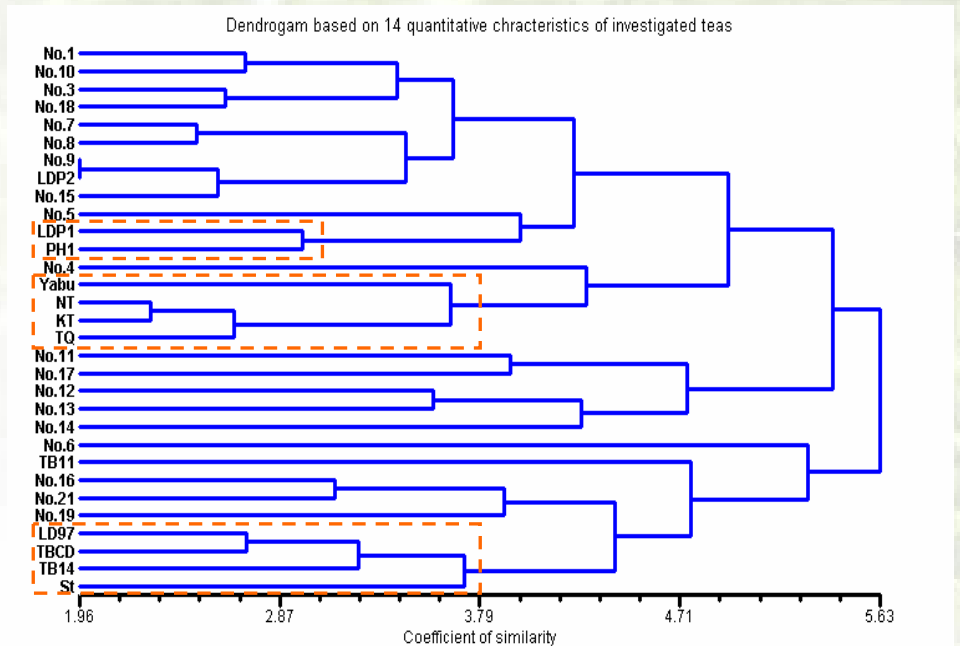


Figure 1. UPGMA-derived dendrogram illustrating the relationship among 31 observed teas. Commercial teas with the similar morphological characteristics were grouped by interrupted boxes.