Research on the Evaluation Method of Quick and Early Selection Index for Tea Breeding

Tair-Chyang Lee

Use the correlation significance test in regression analysis of the SPSS, the correlations between the parents and 23 offspring through hybridization were analyzed in terms of the sensory evaluation scores, agronomic characteristics and major chemical components of Paochung teas made with them over the four seasons during 2006-2007 as a reference for selection of cultivars for breeding. The results show that the correlations coefficient of agronomical characteristics and Paochung tea quality are not consistent for different seasons and different year. The correlation among different agronomical characteristics and Paochung tea quality has showed significant level in different seasons. This suggests that selection based on agronomic characteristics is unreliable. In chemical components, the correlations are negative between total polyphenols and Paochung tea quality, and the correlations are positive between total nitrogen and Paochung tea quality. The correlations are negative between the ratio of total polyphenols and total nitrogen. The tea leaves that contain less total polyphenols and more high total nitrogen in limit level can be used to produce better quality of Paochung tea. Results suggest that chemical components and Paochung tea quality are more correlated. Therefore, they can be a reference for breeding selection.

Key words：Tea(Camellia sinensis);Breeding;Selection Idnex

Studies of Histological Variation of Blade, Petiole and Stem in Accessions of Camellia sinensis (L.)O.Kuntze. Formosensis Kitamura

Bo-Ru Chen Chui-Feng Chiu Jin-Chih Lin Mau-Shing Yeh

In this study the histological variation of blsde, petiole and stem of 13 accessions including 11wild teas of Camellia sinensis(L) O. kuntze f. formosensis Kitam. and 2 cultivars were investigated. The results are sumarried as follows:

According to the layer of palisade cells, the mostly accessions of Camellia sinensis(L) O. Kuntze f. formosensis, palisade cells showing one layer of cylinder-shaped cells, belonging to assamica group, except De Hua She wild tea, Nan Fong wild tea (1~2 layers), and Lai Tou wild tea, Shuei Jing wild tea (1~3 layers). Petiole and stem structure of wild tea accessions are not significant difference, except Lai Tou wild tea and Shuei Jing wild tea. Anatomy in upper epidermis cells length and width, palisade cells length and width, sclerids distribution of Lai Tou wild tea and Shuei Jing wild tea were especially different from other accession, which were shown to be an ecotype differentiation. Based on the UPGMA cluster analysis revealed these 13 accessions could be divided into three groups. Group Ⅰ included 11 accessions of wild tea. It could be further divided into three subgroup. Subgroup Ⅰ included De Hua She wild tea, Fong Huang wild tea, Mei Yuan wild tea, and Nan Fong wild tea. Subgroup II included Min Ghai wild tea, Yung Kang wild tea, Lai Tou wild tea, and Shuei Jing wild tea. Subgroup Ⅲ included Chih Ya wild tea, Long Tou wild tea, and Le Ye wild tea. Group Ⅱ included Chin-Shin-Oolong, Group Ⅲ included TTES No.8 only.

Key words：Camellia sinensis f. formosensis, Accessions, Variation, Histology

Effects of Retention Day and Pruning Position on the Shoot Growth and Yield Distribution of Tea Tree Among Seasons

Hun-Yuan Chang Wu Horng-Jey Fan

This experiment was conducted in order to investigate a series reaction of summer shoot retention time and pruning position in Taitung tea garden management system, to understand the whole year of distribution of tea yield. The experiment was proceeded from 2001to 2002 at Lungteng, Luyeh district, Taitung, with TTES No.12. The retention day were 90 (two tea seasons) and 165 (three tea seasons) days, the pruning depth treatments included (A) softwood bottom of the green shoot, (B) yellowish-green lignified shoot, (C) reddish-brown with yellow-green shoot (D) reddish-brown shoot, (E) brown lignified shoot (CK), respectively. The results of the experiment showed that pruning position had more obviously effect on the burst date, while retention day had more effect on the plucking date, respectively, and 90 days retention day had better yield harvest date. The tea shoot showed short and small trend with heavier pruning position, but had little effect on leaf agronomic characteristics. The tea shoot of 165 days retention day was larger than that of 90 days retention day, and leaf agronomic characteristics had same trend. Late winter and early spring tea season were more obviously among tea seasons. Whatever pruning position, shoot density tended to increase with tea season in two retention day. Shoot density was gradually increasing with the heavy pruning position, also with the pruning frequency. Shoot density of 90 days retention day was higher than that of 165 days retention day. Among tea seasons had the same trend. The 100 shoots weight of heavy pruning were lighter, and 90 days retention day was lower than that of 165 days retention day. The shoot yield tended to increase on the autumn and winter tea seasons, late winter and early spring tea seasons was conversely. Shoot yield of spring and summer tea season showed reduced phenomenon in both two retention management models. Shoot retention day was actually increase yield of spring and winter crop, and 90 days retention day treatment not only had obvious effect, but also had higher price. Because spring and winter crop were the dominant crops of all season, yield and price of tea got advantage, meant that tea production value was increased, From tea yield distribution among tea seasons, 90 days retention day was more advantage in benefit. The A and B treatments was advantageous on the regulation of yield distribution between spring and winter tea season.

Key words：Tea tree, Yield, Harvest date, Retention day, Pruning position

Dissipation of Four Synthetic Pyrethroids Pesticides in Tea ;lants Expose to Rain

Zheng-Wei Lin Chia-Chang Wu Chin-Jin Hou

Field experiments conducted at Mingjian Township of Nantou County, Taiwan (R.O.C), with tea Camellia sinensis(L.) O. Kuntz cv. Ching-Shing Oolong as a testing variety. Four commonly used synthetic pyrethroids pesticides (bifenthrin, fenvalerate, permethrin, cypermethrin) were sprayed on the canopy of ten years old tea plants, to study the dissipation effect caused by rainfall intensity (0, 5 and 15 mm) and rainfall time (at 1, 2, 3, 4, 5, 6, 7 and 8 hour/hr after spray). The results showed that the pesticides contents of tea plants were closely associated with increasing rainfall

intensity, particularly in cypermethrin and fenvalerate which presented the dissipation rate 57-91% and 65-80%, respectively after received 15 mm/hr of rain fall treatment. There were no obvious tredns between the rainfall time on the pesicides dissipation of tea plants. It is suggested that when rain came after tea plants applied synthetic pyrethroids pesticides to control insects or diseases within 8 hour, and the rainfall intensity beyond 5 mm/hr, the pesticides should re-sprayed again to make sure the control effect.

Key words：Synthetic pyrethroids pesticide, Tea, Rainfall intensity, Dissipation

The Studies of Exobasidium Diseases on Theaceae from taiwan

Hsin-Hui Shih Chuen-Hsu Fu Huann-Ju Hsieh

The genus, Exobasidium, is a phytopathogen and four species including E. gracile, E. monosporum, E.reticulatum and E. vexans occurring on Theaceae have been recorded in Taiwan. E. vexans is an economically important pathogen of Camellia Sinensis. In this paper, the taxonomic and culturing characters of Exobasidium on Theaceae are described in detail. Additionally, we observed the surface structures of the pathogen on host tissues by the scanning electron microscopy.

Key words：Exobasidium, Theaceae, Taxonomy, Scanning electron microscopy(SEM)

Algal Leaf Spot of Tea Plant Caused by Cephaleuros virescens Kunze in Taiwan Dongding-Oolong Tea

Fang-ming Thseng

Algal leaf spot is caused by Cephaleuros virescens Kunze in tea plants. One to over sixty sopts were found in a single leaf. Leaves develop lesions that are roughly circular, grey white to yellow brown, 1.5-4.5 mm in size. Vegetative cell, sporangiophore, setae and sporangia are brightly yellow brown in color under microscope. The head cell, which is terminal on a sporangiophore, bears sporangiate-laterals. Sporangiophore is 250-350×17-22μm. Head cell bears 2-6 whorled suffultory cells. Sporangia are terminal on the suffultory cell. Sporangia and suffultory cells are 23-27×20-25μm and 35-40μm, respectively. Among woody plant species around tea garden observed, only Camellia oleifera and C. japonica are infested by C. virescens.

Key words：Tea, Algal leaf spot, Suffultory cells, Cephaleruos virescens

Chemical Characteristics and Discrimination of Different Grades of Taiwan Dongding-Oolong Tea

Yung-Sheng Tsai Shih-Lun Liu Andi Shau-mei Ou

Total 48 Dongding-Oolong tea samples of different grades evaluated in Dongding-Oolong tea competitions in Lugu were selected as materials. Their major chemical constituents were analyzed and compared, in order to establish the basic constituent profile and to find out the characteristics of Dongding-Oolong tea produced in Taiwan. In addition, the difference in the chemical constituents

among these tea samples of different grades was investigated and discriminated by using principal component analysis (PCA) and linear discriminant analysis (LDA). The results showed that the caffeine and EGCG contents of Dongding-Oolong tea were 1.56% and 3.00%, respectively. The relatively lower caffeine and EGCG contents were the characteristics of Dongding-Oolong tea as compared to Tiehkuanyin tea and High-mountain tea. Most of the chemical constituents among three grades of Dongding-Oolong tea samples were different significantly, but there were no analogous tendencies among them except for the lower EGCG, total catechins, and total dster-type catechins contents of the third grades tea samples. The results of LDA with 7 major chemical constituents selected by stepwise discriminant analysis (SDA) showed the discriminating ability for the different grades of Dongding-Oolong tea were 93.88%.

Key words：Taiwan Dongding-Oolong tea, Major chemical constituents, Linear discriminant analysis, Principal component analysis

The Development and Demonstration of a Multi-layer Withering Machine

Ming-Chun Liu Teng-Feng Huang

Two types of withering machine were developed in this research. The first one was a 3 layers net conveyor multi-purpose withering machine, it might supply 100℃ hot-blast air. The other was a 4 layers net conveyor withering machine and it was only used for hot air withering.

In order to collect the withered tea leaves conveniently, a set of outlet conveyor with 30 degree inclination was attached on both two machines. A set of 100 cm width conveyor was also attached on the 4 layers net conveyor withering machine to onput fresh tea leaves.

Within the past three years (2005-2007), 5 demonstrations were held in main tea areas in Taiwan, 4 farmers and 1 tea manufacturing factory have become the users of the new developed withering machine.

Key words：Tea, Multi-layer, Withering machine

Purchase Behavior Model of Tea Competitions: Example of Tea Competitions of Lugu Farmers' Association

Tsung-Hung Lee Rue-Du Liu

This study assessed the purchase behavioral model of using latent variables of pruchase motivation, drink tea involvement, satisfaction, and after-purchase behavioral intention, purchase characteristics, and elemental data of customers that purchased the Tea Competitions of Lugu Farmers' Association. The questionnaire survey was partly performed on 28, 29 December 2007 at exhibition of Tea Competitions and partly carried out by the mail survey. A total of 306 usable questionnaires were collected. Descriptive statistics of socio-demographic and purchase characteristics were analyzed using SPSS 12.0. The confirmatiry factor analysis and structural equation model analysis were analyzed using LISREL 8.52 for windows. All parameters were estimated by maximum likelihood method. Mainly descriptive findings were as follows: 79.0% were male; 88.1% were married;

30.9%aged from 41to 50 years old; 43.0% were college educated; 30.2% were storekeepersl 60.3%lived in Taichung or Changhua or Nantou; and 27.0% had monthly incomes of NT $40,001 to 60,000. Empirical results indicated that pruchase motivation significantly affected the satisfaction directly and affected the after-purchase behavior indirectly. Drink tea involvement significantly affected the satisfaction directly and affected the after-purchase behavior indirectly. Satisfaction significantly affected the after-purchase behavior directly.
Key words：Tea Competitions, Purchase motivation, Involvement, Satisfaction, Structural equation model

Inquiry on the Teaching and Learning of Tea Art for Taiwan Children from Psychological Level

Cheng-Nan Lai

The teaching and learning of tea art for children is the basis of overall teaching and learning of tea art, it is also the foundation of future tea culture. Some workers of tea culture and education have cooperated and introduced the tea art to the campuses of Elementary School and Junior High School recently. Therefore, the tea art has added some fresh contents for the campus culture; it also has developed a new space for the popularization of tea art culture. But it still does not form an upsurge in Taiwan. This paper inquiry the conditions of teaching and learning of tea art for Taiwan children from the levels of standpoints of teaching and learning, psychology of children development, teaching and learning of tea atr for childewn, and extension examples. Then it will put foreword the following suggestions:

1.The tea art for children should not only limit in the learning and demonstration of the tea-brewing skills. Its connotation should be extended.

2.The teachers of tea art need to know how the children's background knowledge affect their understanding.

3.In order to help students to learn in understanding basis, and don't urge them to obtain no related knowledge and skills. The contents of curricula should be designed according the characteristics of child's psychological age. Or let the teaching materials fuse into teaching and learning of different areas.

4.In order to let teaching and learning be more effective, the pedagogical content knowledge are the major learning parts for teachers (including teachers of tea art).

Key words：Child psycholoty, Tea art for children, Teaching and learning