The Discovery, Investigation, Taxonomic Clarification and Resource Utilization of the Taiwan Native Wild Tea Plants

Meng-Chin Hsiao[1] Sheng-Shun Wu[1,*]

Summary

The Taiwan native wild tea plant belongs to *Camellia* and grows at Taiwan mountains could be made to the different teas. Although there were reports in the Qing Dynasty, but the scholars and government officials did investigate its plant taxonomy and assess the feasibility for tea production until the Japanese colonial period. At that time, they considered the quality using India tea plant to make the black tea was better than the Taiwan native wild tea plant. Planting Assam cultivar was appropriate for the black tea production in Taiwan at that time. About taxonomic treatment on the Taiwan native wild tea plant, the latest classification is positioned as species, scientific name *Camellia formosensis*. Today, in addition to utilize for breeding material at Tea Research and Extension Station, the male parent of TTES No.18 cultivar, only Liouguei, Taoyuan Districts in Kaohsiung City and Yuchih Township in Nantou County use Taiwan native wild tea plant to produce few teas. Because of its special flavor, unlike the general tea products, some particular tea lovers are often going to production areas for purchasing. Yungkang tea plant found at the mountainous areas in eastern Taiwan is currently classified as a variant of *Camellia*, scientific name *C. formosensis* var. *yungkangensis*, because slightly different external morphology compared with the west population. It emits a similar mushroom strong odor. That tea has a unique flavor and commodity value.

Key words: Taiwan native wild tea plant, Yungkang tea plant

A New Cultivar of Black Tea- TTES No.23

Shih-Hao Weng Jin-Chin Lin Ju-Hung Lin Cheng-Chung Huang
Yu-Ju Huang Yen-Shuo Su Chih-Yi Hu

Summary

Taiwan Tea Experiment Station Number 23, (TTES No.23, line code: Chi-Ban-1) was a line selected from natural crossing progenies of Keemun family. In 1938, Professor Yamamoto of the Imperial

University of Taipei collected the tea seeds from Keemun County, Anhui Province, China, and sent them to the Yuchi Black Tea Research Branch, Central Research Institute (now the Yuchi Branch of Tea Research and Extension Station) for seeding. After been cultivated and researched more than 80 years, the small-leaf (or *sinensis* Type) tea cultivar which was suitable for making rich fragrance and excellent black tea was selected. This cultivar has reviewed and approved on 24th July, 2018, and officially named "TTES No.23".

Taiwan climatic conditions are appropriate for the cultivation and growth of TTES No.23. The tree type of this cultivar is shrub which possesses intermediate type of tree posture, strong vigor of plant growth, oblong leaves, slightly undulate leaf, the mature leaf is 8 to 10 cm in length and 3 to 4 cm in width, white hairy buds, early bud germinating date, green with red buds, strong disease resistance and drought tolerance. The tea liquor color of black tea which made by TTES No.23 is bright and gorgeous orange. The tea aroma is floral and fruity fragrance. Its taste is thick and slightly astringent. It is a small-leaf tea cultivar suitable for making high quality black tea. This cultivar could increase the diversity of local tea varieties and enhance the competitiveness of Taiwan tea industry.

Key words: TTES No.23, Natural crossing, Black tea, Small-leaf tea tree

Effects of Phosphate-solubilizing Bacteria Fertilizers on Tea Plant Growth and Tea Quality (Report of 1st Year)

Jia-Ru Dai Shiou-Ruei Lin Jin-Chih Lin Chui-Feng Chiu
Hsien-Tsung Tsai

Summary

In Taiwan, it is not requested to submit an experiment report of fertilizer effect whenever application for registration of microbial fertilizer. Furthermore, there is no regulation for the quantitative test of activity indicators. All of these factors could explain why both of effective and non-effective responses resulted from field trials. This contradictory response has made farmers lose their confidence for the microbial fertilizers. Therefore, in this study, two commercial phosphorus-solubilizing bacteria fertilizer products were selected for this study, applied to tea fields with low, medium, and high available phosphorus levels and the effects of phosphate-solubilizing bacteria fertilizers with reduced phosphate fertilizer on tea plant growth and quality were investigated. Results showed that after using two commercial phosphate solubilizing bacteria fertilizers, population of phosphate solubilizing bacteria of

rhizosphere and non-rhizosphere soils were both higher than those before application but there were no significant difference among treatments. There were of no effect on the yields of tea leaves and nutrients content of tea with phosphate solubilizing fertilizers. For sensory evaluation, the treatment 1 was the best consistently in the three different levels of soil available phosphate experimental areas, which means to promote green tea quality. Therefore, the selection of a suitable microbial fertilizer based on soil properties can effectively improve tea quality.
Key words: Tea, Available phosphorous, Phosphorus-solubilizing bacteria fertilizer

Effect of Soil Moisture Regime on the Shoot Growth of Tea Tree

Hun-Yuan Cheng

Summary

The purpose of this experiment was to inquiry the effects of soil moisture regime and on the shoot growth of tea tree (*Camellia sinensis* L.), and to use different soil moisture tensions as the moisture management method for the irrigation starting point. In order to understand the optimum range of tea tree water requirements, it could be as a reference for water saving irrigation. According to the experimental results, the linear regression equation obtained from the reading of soil moisture tension meter and the soil moisture content was y (soil moisture content) = 28.3-0.1107 x (reading of the soil moisture tension meter). When the soil moisture tension reached more than 100 cbar, it had a significant effect on tea shoot growth. Different tea tree cultivar showed different responses to soil moisture regime, and the degree of influence was higher in Chin-Shin Oolong than in TTES No. 12 and grafted Oolong. When the soil moisture tension reached 80 cbar and then supply water, it would have a significant impact on the shoot growth of grafted Oolong and Chin-Shin Oolong, while TTES No. 12 could still tolerate higher soil moisture tension. According to the amount of irrigation water and shoot growth, continuous (0) and 20 cbar water supply have the highest amount of irrigation water, which does not effectively save water resources. If it is possible to conduct irrigation at 40-60 cbar, tea shoot growth will be almost unaffected. Could also achieve the purpose of water saving irrigation. This shows that the use of soil moisture tension meter for tea tree water management can effectively reduce the amount of irrigation water.
Key words: Tea tree, Soil moisture regime, Soil moisture tension, Irrigation, Shoot growth

Effect of Net House Facilities on the Growth and Yield of Tea Tree

Hun-Yuan Cheng

Summary

The purpose of this experiment was to understand the feasibility of using net house facilities in tea garden, and hope could improve the unfavorable climate environment on spring and winter tea production, so as to achieve stable production of spring and winter teas, and reference for production and application of organic tea gardens. The experiment was conducted on the TTES No.12 tea cultivar of organic tea garden in the Taitung Branch, Tea Research and Extension Station. The experimental treatment was including (A) net house facilities (32 mesh), (B) net house facilities (24 mesh), (C) open culture (CK). The experimental result showed that during the low temperature period, the night temperature in the net house facilities plot has increased, and when the relative humidity was lower, the humidification phenomenon in the net house facilities plot was particularly obvious. The growth and quality of tea leaves were better. The spring and winter tea season was the most obvious, and the yield was slightly increased. It has little effect on the made tea quality. It even has the effect of increasing, and increasing the chlorophyll content, and almost no influence for the chemical composition and mineral element contents. Infestation of tea mosquito bug in the open culture plot was significantly higher than that in the net house facilities plot.

Key words: Net house facilities, Growth, Yield, Quality, Chemical component

Development of a Multi-residue Method for Pesticides in Tea Garden Soils Using a Modified QuEChERS Method Combined with LC/MS/MS and GC/MS/MS

Hsiao-Ying Yang Hui-Chun Lin Ru-Hong Lin

Summary

The purpose of this study was to establish a multi-residue method for pesticides in soils. The QuEChERS method was used for sample preparation and analyzed by LC/MS/MS (liquid chromatograph tandem mass spectrometer) and GC/MS/MS (gas chromatograph tandem mass spectrometer). Totally 311

pesticide compounds were analyzed in this method, 195 pesticides analyzed by LC/MS/MS (recovery between 32.41-136.10%) and 116 pesticides by GC/MS/MS (recovery between 52.52-106.64%). 308 pesticide compounds obtained limit of quantitation of 0.02 μg/mL, and the other 3 compounds were 0.05 μg/mL. Analyzed 36 soil samples, there were 46 pesticides detected. The highest detected rates were difenoconazole (30.56%).
Key words: Soil, Pesticide residues, Liquid chromatograph tandem mass spectrometer, Gas chromatograph tandem mass spectrometer

Effects of Different Processing Methods on the Quality and γ-Aminobutyric Acid Content in Mulberry Leaf Tea

Chiao-Sung Chiou Chiu-Hsun Liao Chih-Chun Kuo Tzu-Hsien Wu Chia-Hung Shi Meei-Ju Yang

Summary

Mulberry leaves are rich in many nutrients, trace elements and functional ingredients, especially rich in γ-aminobutyric acid (GABA). In this study, mulberry leaves by the various processing treatments of direct drying, green tea, Oolong tea and black tea. The results showed that the contents of GABA were higher when drying mulberry leaves directly by 100 ℃ and the processing of black tea. The second one is the green tea processing, and the lowest is the Oolong tea processing. In addition, the contents of GABA are higher by the processing of green tea and Oolong tea with vacuum and anaerobic treatments.
Key words: Mulberry leaves, Tea, γ-Aminobutyric acid (GABA)

Using Panel Data to Investigate the Effects of Tea Volume and Pricing: A Case of Famous Tea Competition of the Oriental Beauty Tea in Summer Season, Hsinchu County[1]

Li-Ching Lo Mei-Hua Tsai Cheng-Nan Lai

Summary

In this paper, we use the panel data method of the econometric model as the main research object for tea volume and pricing of the famous tea competition of the Oriental Beauty Tea in summer season, Hsinchu County. The data collection source is July 2008 to July 2017. The main supply and quality factors that affect tea pricing were analyzed.

The results of the study showed that the total tea volume of the famous tea competition in the Hsinchu County, total tea productivity of Hsinchu County, annual sunshine hours and precipitation in May of Hsinchu Weather Station, are significant negative correlation with the tea pricing in Hsinchu County's famous tea competition of the Oriental Beauty Tea; Hsinchu County's total awards of famous tea competitions of the Oriental Beauty Tea, a ratio of winning for each level of Hsinchu County's famous tea competitions of the Oriental Beauty Tea, the annual relative temperature and relative humidity at Hsinchu Weather Station in May have a significant positive correlation with the tea pricing in Hsinchu County's famous tea competitions of the Oriental Beauty Tea. This paper compiles related suggestions for tea garden managements and famous tea competition, and hopes to be references for the planning of tea garden and development & extension of tea industry.

Key words: Hsinchu County, Oriental Beauty tea, Famous tea competition, Pricing, Panel Data