

## Newsletter n°1

Report: mission to China

Association Tea Grown in Europe (EuT)

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<http://tea-grown-in-europe.eu>



green, semi-fermented etc.) are produced from one single specie, *Camellia sinensis*.

We have visited the hilly region situated between the Yangtze River (also named Changjiang, the "Long River") and the Qiantang River, spread over 3 provinces: Zhejiang, Anhui et Jiangxi. Visited places (see satellite view hereunder):

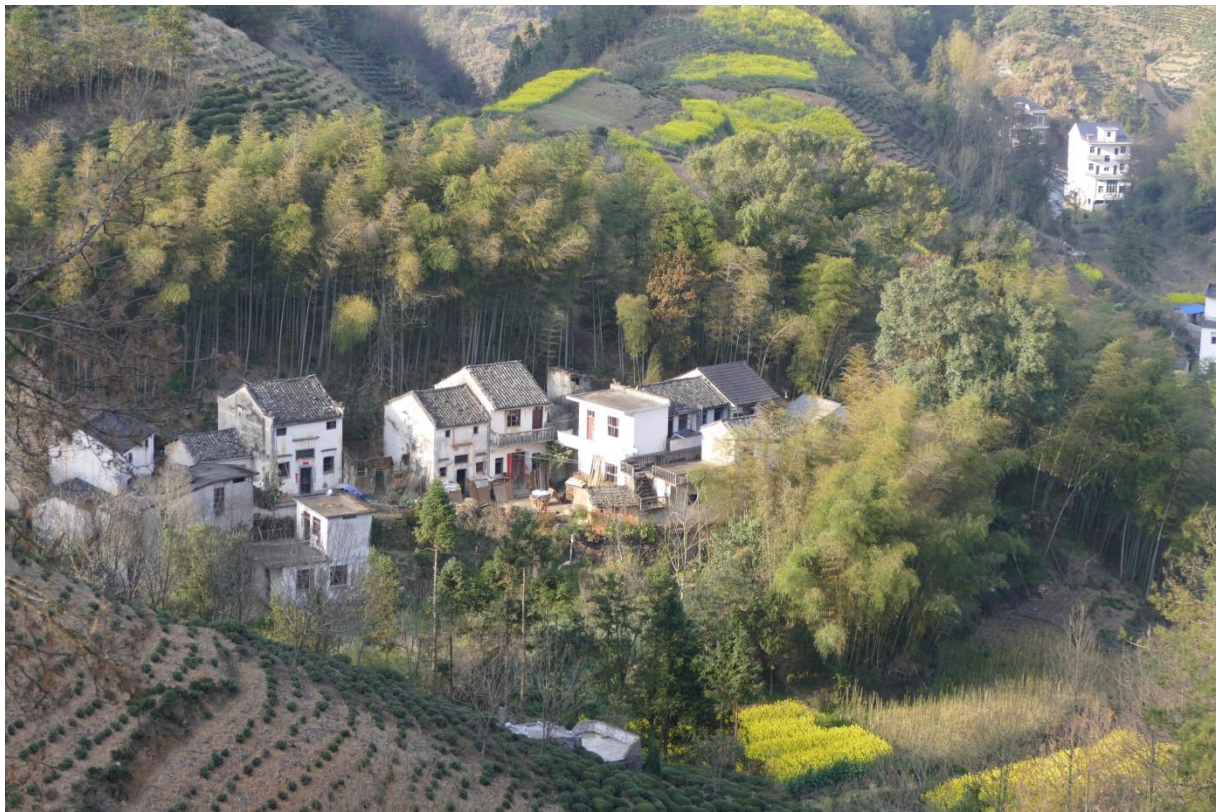


- Hangzhou, capital city of the Zhejiang province, and its surroundings, including Fuyang district;
- Huangshan (Anhui province) et its surroundings, including Shexian and Xiuning districts;
- Jiujiang and Lushan (Jiangxi province).





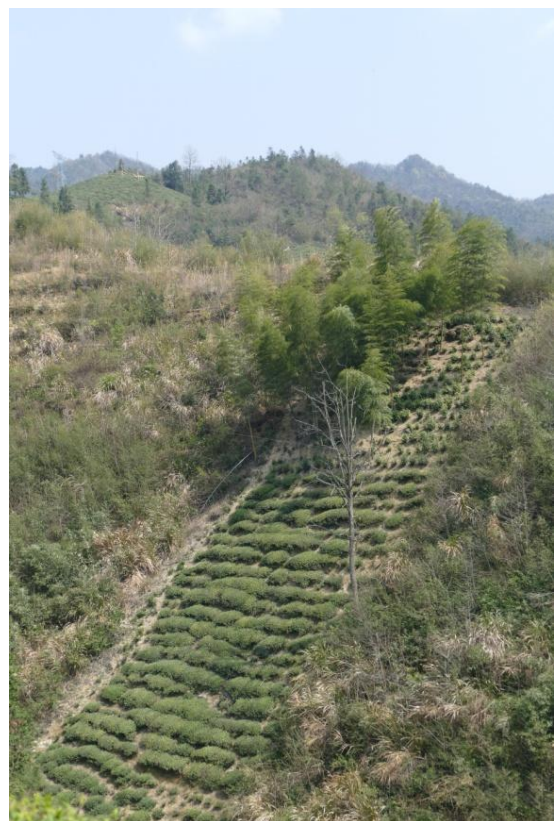
## Cultivation and plucking techniques



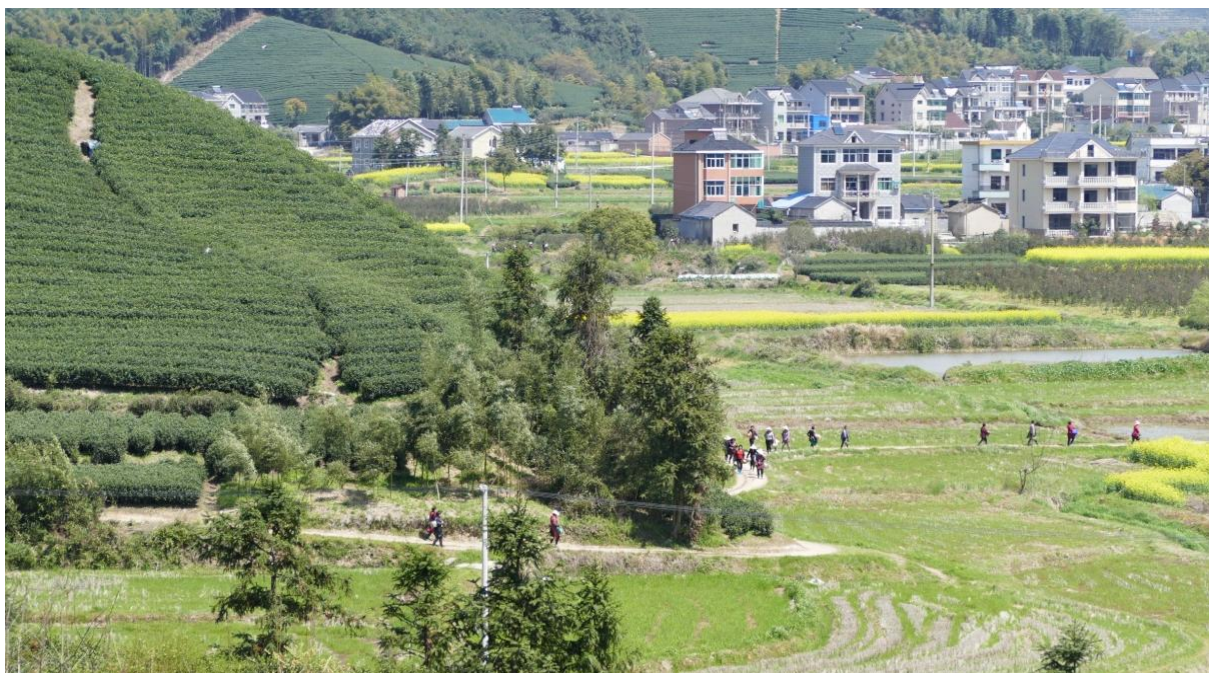
In the visited regions, we have observed a lush vegetation; tea plantations spread along hillsides, dominating blooming colza fields (see picture here above of a hamlet located near the Poshan village, Shexian district). Tea trees have been settled progressively along the past centuries, in areas initially covered with forest or bamboo groves; we can still see a strong interpenetration of these environments. In the Huangshan area, we have also observed the culture of mulberry trees, integrated with the tea plantation; we remind here that mulberry trees are related to the breeding of silkworm, which eats a large quantity of mulberry leaves.

In China, each small piece of land is meticulously cultivated, this applies to the tea regions visited, where we saw tea trees growing on extremely steep slopes (with angles higher than 45°), a situation comparable to some wine yards of the Moselle valley in Germany and France or of the Cinque Terre in Italy.

Plucking of the first flush was reaching its peak of activity during our visit. We have observed an intense work in the plantations and in the tea manufacturing workshops: tea leaves plucked around the « Qingming » festival (the “All Souls’ Day” of the Chinese traditional calendar), more precisely before the spring rain, is the most valuable.







In the regions visited, tea trees are grown on different kinds of soils from red to brown colour; the most fertile ones are located in the alluvial basin of the Qiantang river around Hangzhou, famous for its Longjing (“Dragon’s Well”) Tea. Our expertise in soils being very limited, we provide here a picture showing a section of the soil in the Huangshan region made visible because of recent road works; the soils appears of red colour and rather stony on its surface.



Regarding cultivation techniques, tea trees are generally planted in rows, with a distance of around 1.5m between rows allowing convenient circulation. Within a given row, tea trees are either densely planted (less than 30cm between each tree) forming a continuous hedge, or with a wider space (around 1m between each tree) allowing more horizontal development. In most plantations visited, we understood that, after the first flush, trees are generally pruned, limiting their height to 30-40cm. Then, the new leaves produced are sometimes plucked, but it is not the general case; tea plucked later in the season is of lower grade.





Weeding is operated either using systemic herbicides, or manually. We have also observed in the most modern plantation, the use of water sprinklers, allowing to maintain air humidity during hot and dry periods, and also solar powered UV lamps against insects (see pictures hereunder).



In the visited plantations, leaves were plucked exclusively by hand; pluckers are paid according to the quantity of leaves harvested, around RMB40-100 RMB (€5-13) per kilogramme of fresh leaves. Experienced pluckers can harvest around 5kg fresh leaves per day, corresponding to a price of €25 to 65; deducting the plantation maintenance and land costs, estimated altogether to a bit more than half of the total, one can estimate that one day of plucking is paid around €10-30, depending on the place and season. Even if the job of plucking is not reserved to women, their proportion is fairly high. Our correspondents also mentioned the existence of mechanised plucking, however is seems used only for very low grade tea.

All visited plantations were exclusively composed of the smaller leaves variety (*Camellia sinensis* var. *sinensis*); in large plantations, we saw mainly clones of renown genotypes, such as "Longjing 43" or "Huangshan Cuilü"; we have also noticed in the Fuchun area, the cultivation of a "white" variety, in fact a kind of tea tree with leaves that appear lighter coloured than those of conventional tea trees. It seems that this variety meets a growing demand of the Chinese market for "white tea"; moreover, this variety flushes later than conventional varieties, allowing a more even distribution of work across the plucking season. The term "white tea" in Chinese (*baicha*) is however unclear; according



to the description presented at the tea museum in Hangzhou, “white tea” is not a tea manufactured from a specific variety of tea tree, but is processed with a longer withering phase than green tea. Of course, in both China and Europe, the terms used are strongly influenced by marketing strategies; as an example, we recently observed with interest the emergence of “blue tea” in some French tea shops!



Propagation relies essentially on cuttings taken from genotypes considered as well adapted and economically viable. In the Huangshan area, we have visited a company specialised in growing plants from cuttings. Branches of the year are collected on existing plants, and then cut in small segments leaving a leaf on each segment; then, these are planted on an irrigated plot under a black tarp.



In the Jiujiang / Lushan plantation (picture here above), propagation relies on the natural seeding process; small plants (2-5 years old) are then planted at their final place.



## Green tea manufacturing

Green tea is characterised by its fresh and grassy flavour, very close to the fragrance of fresh leaves. Its manufacturing is both simple and complex; simple because it involves a limited number of operations in a relatively short timeframe (less than one hour if we exclude the drying step) and a limited set of equipment (a stove and a wok), complex because operations are critical and need a permanent control.

We were lucky enough to visit several kinds of manufacturing workshops, from the family workshop consisting of one small room of the house, to large hangars of more than one thousand square meters with more than ten persons working on different machines; even in the last case, part of the equipment is operated manually, mainly to process the first flush or high grade teas.



Fresh leaves are spread in large bamboo baskets, stored in the shade during a few hours, then, undergo three main steps: fixing the aroma, shaping, drying.

First step, fixing the aroma (*shaqing*), sometimes referred to as “roasting” by analogy to coffee: leaves are heated at a temperature of 180-220°C in a large iron wok generally sealed in a stove, leaves are turned upside down quickly and repeatedly during 6-7 minutes to prevent them from burning. During this operation, the enzymes responsible for oxidising / fermenting are deactivated. This step, often performed manually is crucial in the fabrication process; if not conducted properly, green tea may take a burning flavour or a dark colour; it may also start to ferment after its manufacturing.



Second step, shaping the leaves (*rounian*), sometimes referred to as “rolling”: leaves are manipulated at lower temperature, 120-150°C, generally in the same wok, so as to reach their final shape: flat for Longjing (“Dragon Well”), twisted for Maofeng of Yunwu.

Third step, drying (*honggan*), to lower the degree of humidity of leaves down to 6-7% before packaging; leaves can be directly dried in the initial wok, they can also be spread in large trays placed

in an oven during 2-3 hours at a temperature of around 60°C. In small workshops run by families, these ovens are generally home made. Sorting is then performed to remove the broken leaves.



Most of the steps are operated manually and require some dexterity, in particular the above described “*shaqing*” step. The stove is heated either by electricity or wood; split bamboo is also commonly used as fuel; for the “*shaqing*” step, we have also observed the use of dried branches of *Cunninghamia lanceolata* (a magnificent tree rather common in the region) which provide a short but intense temperature increase.

We have also observed with interest the use of rather light machines for the fabrication of flat leaves green tea (Longjing type), performing all three above described steps in a continuous way. These machines are driven by a microprocessor : the parameters (temperature, speed etc.) of each step can

be finely tuned. The result is impressive, one single person can operate / monitor simultaneously 3 different machines, leading to a yield improved by a factor of 10 compared to a manual process.





Each year, between March and April, around the first flush time, rural festivities are organised by some villages. We were lucky enough to attend such event in a village of the Shexian district; activities included various demonstrations for tasting the new green tea, a manual tea processing contest, a competition of Chinese chess and, of course, a large banquet. The rural and benevolent atmosphere was extremely pleasant, reminding us wine or cider festivals organised during the autumn in some villages of our old continent.





### The professional tea market in Hangzhou

We had the opportunity to visit a large tea professional market, situated in the suburbs of Hangzhou, supplying most of the local merchants. We saw large quantities of Longjing type tea (“Dragon Well”) coming directly from the nearby tea plantations in large boxes; some wholesalers were sorting the leaves using either large bamboo sieves or electric fans blowing out broken leaves. Other wholesalers were proposing packages, from the most simple paper boxes to elaborated customised porcelain jars, including various boxes made of wood or bamboo.



### The National China Tea Museum (Hangzhou)

The National China Tea Museum is superbly located in the West part of Hangzhou, nearby the Longjing (“Dragon Well”) village, celebrated for its famous eponymous flat leaves tea. The museum consists of various buildings spread across a vast yard surrounded by endless tea plantations; the main building houses the permanent collections, while other buildings are dedicated



to various activities: tea processing, tasting etc. This museum, as many other museums of Hangzhou, is totally free. The surrounding tea plants appear to be carefully grown; being there during the first flush, we could observe an intense plucking activity.





The history of tea in China, which goes back to more than four thousand years, is presented in the first room. Different samples of tea leaves currently processed in China are presented in small windows, among them the impressive leaves of the “Taiping Houkui” tea (see picture), produced in the Huangshan area, exceeding in some cases 5 cm long. Different products based on tea, as well as utensils used for brewing tea are displayed in a didactic way. We noticed various old machines used for tea processing, among them, this large rolling machine all made of wood, including the rolling plates.







We have discovered during our visit that not only tea leaves, but also flowers and seeds can be used in many products, including food (beverages, biscuits, sweets or seasonings), health-care (the polyphenols present in tea leaves have acknowledged antioxidant properties), cosmetics or even building materials. As an

example, saponin extracted from tea can be used for cosmetics or even as an additive to concrete. We also mention here the edible oil that can be extracted from tea seeds; however, this oil is not as valuable as the one extracted from specie of *Camellia*, *Camellia oleifera*, mainly cultivated in Jiangxi and Hunan provinces.

Among other objects displayed, our attention was drawn by a strange kettle used in China in the years 1920-1930 that presents an internal wall dividing it in two separate compartments, one for charcoal, the other one for water, charcoal being directly burned in the kettle.





## Visit to the Tea Research Institute of the Chinese Academy of Agricultural Sciences and to the University of Zhejiang (Hangzhou)

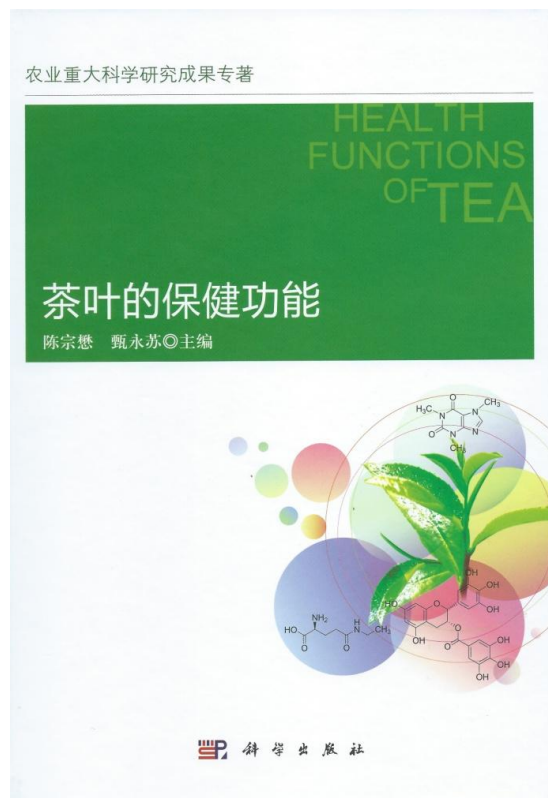
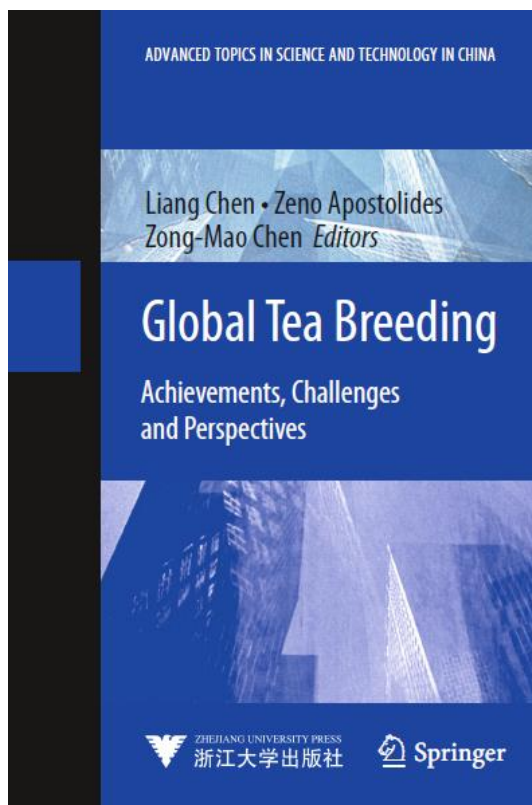
We have visited the Tea Research Institute of the Chinese Academy of Agricultural Sciences, located in the South-West part of Hangzhou, where we were extremely honoured to be received by Professor Chen Zongmao, Academician.

Pr Chen was the director of the Tea Research Institute from 1983 to 1994. He was elected as the Academician of Chinese Academy of Engineers in 2003 and was appointed as the President of the CCPR (Codex Committee for Pesticide Residue) of the FAO in 2007-2010. He conducted research on



the pesticide residues in tea since 1961, including research in the contamination of BHC and DDT in tea, on the prediction of pesticide residue in tea according to the physic-chemical and ecological parameters, contributing to the establishment of standards in China and worldwide. His research topics also include the chemical ecology of

insects since 1999. He published more than 200 papers in Scientific Journals and is editor and author of one of the reference book of tea growers worldwide: *Global Tea Breeding - Achievements, Challenges and Perspectives*, co-edition Zhejiang University Press & Springer, 2012.

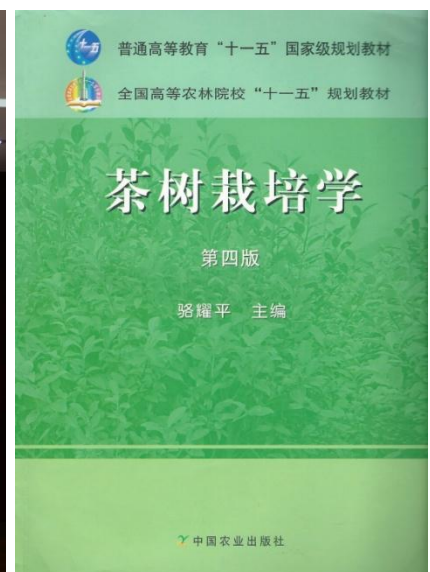




He has also edited and authored a scientific book in Chinese on the health functions of tea. This book compiles various articles based on epidemiology studies and clinical testing. Examples of benefits of tea on human health: anti-aging, enhancing immunity, lowering blood sugar and fat content, allergy prevention, preventing neurodegenerative disorders including Alzheimer's disease, preventing cancer, etc.

Our meeting with Academician Chen was an immense honour for our small community and an encouragement to continue our efforts.

We have also been received by Professor Luo Yaoping, from the tea department of the University of Zhejiang, author of a reference book on tea cultivation; this book is also a main teaching material for university students in the domain. We attended his presentation on tea cultivation in China with a very high level of interest and had the opportunity to ask many questions, especially in relation with the adaptation of tea plants in Europe; exchanges were extremely fruitful, we left with a solid knowledge basis, looking forward to apply this knowledge when we are back to Europe.



### **Perspectives for cooperation**

When preparing our mission to China, we were indeed a little bit anxious: could China, the great country that has “invented” tea more than 4000 years ago as well as the world's largest producer, open its doors to us and accept to dialogue with our young association?

The answer is definitely positive; the outcomes of our mission go even beyond our expectations. During our mission, we have been warmly received by our Chinese correspondents who have expressed some curiosity and even interest in our European initiative, and were extremely opened to dialogue and questions.

Of course, we could gather technical information that we are eager to share with our Members and also set the foundations of future cooperation, especially with respect to the introduction of Chinese varieties adapted to the various soils and climates across Europe. We hope to be able to provide the first samples to our Members by the end of this year.



Our young association is also keen to discover the know-how of the different regions in the world where tea is cultivated. Projects for future missions to different countries (Sri Lanka, India, Japan, Korea...) will be discussed during the next general assembly meeting of the association. Regarding mainland China and Taiwan, many other areas are of high interest: we are keen to visit soon regions of the south-east and south-west regions, respectively specialised in semi-oxidised (*Wulong*) and post-oxidised (*Pu'erh*) tea.

