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Today's Hometown of *Metasequoia* – Lichuan, Hubei, China

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Abstract: After sixty years of the discovery of the "Living Fossil", *Metaseuqoia glyptostroboides*, from China, the news of her mystery story is still sparking the readers worldwide. However, for various reasons, the hometown of *Metasequoia* has not been visited for most of readers, even after Chinese government has opened it's door to botanizing since 1980s; and more important, the current situation of this mystery tree in there are still not known well today. Here we present you detailed information on the hometown of the "Living Fossil" with it's various resources of geography, weather, forests, vegetation, species, *Metasequoia* native trees as well as protection state as well as the travel information first time in the natural history of *Metasequoia*.

Introduction

A small town, Moudao (formerly Moudaoxi, Mou-tou-chi, Modaoqi, Motaotsi, Modou, Ma et al. 2000a), the remote countryside around east Sichuan province and west Hubei province, in central China, was not known to either botanists or amateurs around the world before the "Living Fossil", *Metasequoia glyptostroboides*, was found in the later 1940s; even Dr. RALPH W. CHANEY, then the professor of Department of Paleontology, University of California, can't find where it was by his best Chinese Map at University of California Berkeley library



during early spring of 1948 before he started his famous trip to the hometown of Metasequoia, after he got the letter from Dr. Hsen-Hsu Hu in Beijing (formerly Peiping, SILVERMAN 1990). However, after CHANEY and SILVERMAN'S return from their famous journey to central China around the end of March and early of April. 1948, almost everyone knows this famous village, from west coast to east coast in the USA, from the States to Europe, even around the globe. Moudao is a famous town in the natural history of *Metasequoia*, where not only the first specimen collected in 1943 (M_A 2003a, b) which triggered the story of discovering of the 'Living Fossil', but the type specimens collected in 1946 (H_U & CHENG 1948, Hsueh 1985) from the same tree, and even some of the first group of seeds also from there which were sent out of China to the USA and Europe during the winter of 1947 and the spring of 1948. Xiaohe (formerly Hsiao-ho, Hsio-ho, MA et al. 2000a), another local place which was frequently appeared in the papers, is a small village of Lichuan, where natural and original native forests of Metasequoia was found in 1947 (CHENG & CHU 1949, CHU & COOPER 1950), usually called as Xiaohe Valley (including Guihua and Xingguo communities, see Map 1) or more frequently as Metasequoia Valley, or Tiger Valley, which is existed in southwest of Lichuan.

Geographical Location

Both Moudao and Xiaohe are administratively to Lichuan City (county level, Hubei now, though Moudao formerly belongs to Sichuan in 1940s). Moudao is in the northwest of Lichuan, about 42 km away, and Xiaohe is in the south of Moudao, about 80 km away. Lichuan, an agricultural county, is in west Hubei, with 820,000 populations, at the area bounded by Enshi City in the east, Xianfen Xian in the south, Shizhu Xian in the west, Wanzhou (i.e. Wan Xian, a new name since 1997, formerly administratively by Sichuan province, now by Chongqing Municipality), Yunyang Xian in the north, geographically between 29°42'-30°39' N, 108°21'-109°18', about 123 km from Wanzhou at north side of Yangtse River (Chang Jiang), about 97 km to Enshi (District City, Hubei) in the east, about 720 km to Wuhan (capital of Hubei) in the far east and about 456 km to Chongqing (Municipality, formerly a part of Sichuan) in the west (MA et al. 2000b, see Map 1, 2).

Weather Condition

Lichuan is geographically located in the east extension of Yunnan and Guizhou Plateau of southwest China crossing zone to the East China Plain, surrounded by the extensions of Dabashan in north and Wulingshan in south, with Qiyaoshan in northwest, Fubaoshan in the middle, and Mashan in southeast (see Map 1), altitudes between 315-2041 m. Qing River (Qing Jiang), a south branch of Yangtse River, is originated from this county. The typical weather belongs to subtropical monsoon, combined with north subtropical temperate character. There is no bitter cold weather in the winter, not very hot but moist and warm in the summer. The annual average temperature is around 12.7°C, with no frost period up to 233-266 days, and annual precipitation up to more than 1300 mm, average moisture up to 81.6%. Mixed climate is with local complex topography, various micro-weather condition dominates local weather, especially by the space one.



Map 1. Lichuan administrative map.

Vegetation and Species

From the early record which could be traced today that the original vegetation in the area where *Metasequoia* was found, back to about 500 years ago, were mainly heavy and natural original forests, including *Metasequoia*, even to the Qing Dansty (1700's-1900's). By the 1940s the vegetation covered rate has been dropped rapidly since the human being moved into the area for settlement (CHENG & CHU 1949). During 1960-1980s largely reforestation have been done by the local governments, and more have been made since 1980s by private farmers. So far the vegetation could roughly called as natural and artificial combination. Among them, manmade artificial forests has been up to 120,000 hactures, especially young and middle ages forests. To 1990s, the vegetation 25

covered rate could reached up to 50% (Lichuan Zhi Editorial Committee 1992, QI & Liu 1997). And the local distribution of forestry lands are more than 50% at Maoba, Moudao, Shaxi, Wendou, Yuanbao, and Zhonglu Districts, and more than 40% at Liangwu, Tuanbao, Wangying, Boyang, Jiannan Districts etc in Lichuan (see Map 1). The main vegetation types could roughly treated as following: Alt. 800 m or below there is mainly Economic Forests - Vernicia fordii forest and Rhus vernicifera forest, associated mainly by Sapium sebiferum, Trachycarpus fortunei, Broussonetia papyrifera, Cunninghamia lanceolata, Pinus massoniana, Cupressus funebris, etc; Alt. 800-1000 m there are Evergreen Broad Forests and Evergreen Conifers - Cunninghamia lanceolata forest, Pseudotsuga sinensis forest, Pinus massoniana forest, associated by Metasequoia glyptostroboides, Taiwania flousiana, Cercidiphyllum japonicum, Phoebe spp., Photinia spp., Trachycarpus fortunei, Populus davidiana, and Magnolia spp. etc.; Alt. 1000-1300 m there are Evergreen and Deciduous Mixed Forests mainly composed by Davidia involucrata, Schima superba, Cryptomeria Magnolia officinalis, Liquidambar formosana, Juglans regia, fortunei. Tetracentron sinense, Platycarya strobilacea, Cyclobalanopsis spp., Betula spp., etc.; Alt. 1300-1500 m there are Deciduous Forests mainly composed by Liriodendron chinese, Liquidambar formosana, Carpius spp., Cyclobalanopsis spp., Lithocarpus spp., Betula spp., etc.; Alt. 1500-1700 m there are mainly Alpine shurbs composed by Rhododendron spp., Sorbus spp., Phellodendron chinense, etc.; Alt. 1700-2041 m are bamboo shrubs composed mainly by bamboo species.

> Southwest Hubei Enshi and neighbour county



Map 2. West Hubei - Enshi and it's neighbor area. 26

Forestry Species

According to the current investigation, there are 191 families, 557 genera and 1037 species of vascular plants in Lichuan (Lichuan Zhi Editorial Committee 1992). Among them there are 235 tree species, 303 shrubs species, 17 bamboos species, 66 woody lianas species. In these species, there are 3, i.e., *Metasequoia glyptostroboides, Davidia involucrata*, and *Taiwania flousiana*, belongs to the first grade protection list of Chinese Plants; and 12 species belongs to the second grade protection list of Chinese Plants: *Ginkgo biloba, Juglans regia, Ecommia ulmoides, Cercidiphyllum japonicum, Emmenopterys henryi, Davidia involucrate* var. *vilmoriniana, Manglietia patungensis, Liriodendron chinese, Pseudolaris amabilis, Tetracentron sinense*, and *Michelia wilsonii*, as well as many old relics and elements in the Chinese floristics, such as *Pseudotsuga sinensis, Pteroceltis tatarinowii, Amentotaxus agrotaenia, Dipteronia sinensis, Taxus* spp., *Tsuga* spp., *Cephalotaxus* spp., *Magnolia* spp., *Cinnamomum* spp., *Sargentodoxa cuneata, Phoebe* spp., *Sassafras* spp., *Phellodendron* spp., *Cyclocarya* spp., etc.

Matesequoia

The natural distribution of Metasequoia is within about 600 km, area by 30 km long and 20 km wide in the Xiaohe Valley (30.3° N, 108.6° E), Metasequoia Valley or Tiger Valley (Shui Shan Ba or Shui-Sha-Pa in Chinese, see Map 1 and Figure 1, 2), with about 5800 plants mainly within 1200-1500 m altitude and limited 900-1500 m only; and some of them are more than 100 years old, with oldest more than 420 years, largest up to 40 m high, and more than 2.4 m at DBH (BAN & QI 1995, Fig. 3). Natural associated trees include mainly Castanea henryi, Houttuynia cordata, Liquidambar acalycina, Polupus adenopoda, Pterocarya spp. etc. Now most of them has been treated as the mother trees for the seed as well as for protection purpose since 1950s. Besides distribution in Hubei, the natural distribution of *Metasequoia* were also found in Shizhu Xian (c. 30° N, 108° E), Sichuan province (now belongs to Chongging), and Longshan Xian (c. 29.5° N, 109.5° E) and Sangzhi Xian (c. 29.4° N, 110.2° E), Hunan province. From 1955, local nurseries have provided with 35000 plants to various organizations both within China and in the world, and cultivated Metasequoia forest has been up to 400 hectares by 260000 plants in Lichuan. The manmade forests of Metasequoia has been largely cultivated in the local district - Enshi with area up to 4,465 hectares by 21525000 plants by 1995 (see Figure 4, 5, 6), besides the cultivation in the province and in the national wide of China which has been reported from south Liaoning province in northeast (latitude c. 41.5° N), Beijing in north (c. 40° N), Tianshui (34.5° N, 105.8° E), Gansu province, Wugong (34.5° N, 108.2° E), Shaanxi province in west, Leizhou Peninsula (c. 21° N, 110° E) between Guangdong province and Hainan province in south and to the east coast of East China (see Map 3); and the total plants has been up to 12 billions (Lichuan Zhi Editorial Committee 1992), i.e. average almost one plant per person in this vast population country of China (c. 12.7 billions people in 2001, the official figures reported online by Chinese Government). The most common 27

cultivated area of *Metasequoia* are from the east coast to central China, and the best growing area are located in the central China, especially in the Yangtse River Plain in Hubei and it's neighbors; and the growth rate at the hometown could be up to 60-80 cm high and 1.0-1.75 cm at DBH each year before 50 years old, which is similar to *Cunninghamia lanceolata* (fast growing timber species in south China), *Populus* spp. (popular growing timber species in north China), and *Platanus* spp. (common and fast growing trees in central China). The cultivated *Metasequoia* at her hometown could produce its male and female cones even 16-18 years old and have seed at maturity; however, the peak time of seed production should be after 40 years old, even up to more than 100 years old, and the type tree, more than 420 years old, still produce her own seed every year (see Figure 7).



Map 3. Map of China with cultivation of Metasequoia.

Protection

In 1973 the local government has established special management station in Xiaohe for protecting the native trees of *Metasequoia*, and they registered all of the native trees in the area, and all of large trees has been archived and filed since then (Lichuan Zhi Editorial Committee 1992). Currently there are more than 5750 large trees, and it's average diameter has been reached to more than 50 cm (W_{EN} et al. 2001). At the same time, some further protection methods has been made for all of the big trees either by enlarged living growth space, removed the barriers from its further growth, made the walls to protect the habitat nearby, or fenced special target like Type Tree (Fig. 7) as well as mounted the lightening rod on top of the tree from the attach by lightening. *Metasequoia* Seed Garden in Xiaohe was established by the local forestry

government as Xiaohe *Metasequoia* Mother Tree Management Station. This station has harvested their seeds up to 18000 kg since 1979, up to 445000000 seedlings has been cultivated, up to 160000000 cutting has been produced and sent out not only within China but also the worldwide, and economic income up to 35000000 Chinese Yuan (W_{EN} et al. 2001, about \$4.25 million). The tree has been primary proud of by the local people and government, and it has been chose as City Tree by Wuhan, the capital of Hubei, in March 1984 (Fig. 8).

Major Questions

At current understanding according to local research work (WEN et al. 2001), following three questions are more serious from the protection review of Metasequoia at her hometown. First, along with coal cooking by local people, the coal smoke pollution has become a serious treat to the native habitat of Metasequoia since 1980s; and the 8 big trees (more than 1 m at diameter and more than 40 m high) at Xiaohe died from this in 1995. This was a very nice scene once in there which has gone forever. And more serious is that more than 2870 trees are distributed around the houses by less than 20 m away only, and potential damaging may be possible in the future. Second is natural disasters included the severe lightening from weather and water erosion by largely scale floods which has been happened every year, and up to 2% of large trees has been damaged average each year in the past 20 years. Third is an insect, Choristoneura metasequoiacola (Tortricidae, Lepidoptera) which eats the leaves of this tree has become aggressive trends in the recently. Though certain protection methods have been used, there are no effective methods to stop this since the size of the tree is huge, and the result of various ways are not very effective. Since it has been found, there about 684 trees, about 11.9% of total large trees, has been effected by this kind of insect (WEN et al. 2001). The last, like everywhere in China, the money for the management and maintains for the native Metasequoia protection and research are always less than that they need or expect since then.

Travel Information

Today's travel to the hometown of *Metasequoia* is quiet different from Chaney and Silverman trip in 1948, and it's much easy. One more suggestion to our readers when you are going to the hometown of *Metasequoia*, you'd better visit the famous *Three Gorges* of Yangtse River between Hubei and Chongqing. An very recent personnel experience by a professor of botany who visited the hometown of *Metasequoia* from Great Britain is at our website (http://www.metasequoia.org/comment.htm), besides the following guides for your trip.

By Airplane

The main airports in China are Beijing (Capital of China in northern China), Shanghai (Municipality of China in eastern China), Guangzhou (Capital of Guangdong in southern China), Kunming (Capital of Yunnan province in southwestern China) and Hong Kong (Special Administration Region of China in southern China, next to Guangzhou). From above, you could fly to the following cities: Wuhan (Capital of Hubei in central China) and Chongqing (formerly city of

Sichuan, now Municipality of China in southwestern China); and from any of these you could fly to Yichang (Regional City of Hubei, also the Eastern Startpoint of The Three Gorges on the Yangtse River, or Enshi (District City of Hubei, also the only city around the hometown with airport). Another airport in Wan Zhou is available now from Beijing, Chengdu and Guangzhou to the hometown from any place of China and back on the same day.

By Boat

The main waterway to the Hometown of *Metasequoia* is along the Yangtse River in China, from the east, start at Shanghai, you would pass by Nanjing (Capital of Jiangshu province in East China, also the old capital of China before 1949), Jiujiang (District City of Jiangxi province, c. 25 km away from Lushan, a famous tourist spot), Wuhan (Capital of Hubei in central China), Yichang (District City of Hubei, also the Eastern Startpoint of The Three Gorges on the Yangtse River), Wan Zhou (District City of Chongging in southwestern China, also the Western Startpoint of The Three Gorges on the Yangtse River), and Chongqing. The best way to the hometown via waterway is from Wan Zhou in Chongging.

By Bus/Car

From Enshi in Hubei you could travel by bus/car to Lichuan, and then from Lichuan you could travel to the hometown of Metasequoia; and estimated distances and travel times are: Enshi to Lichuan c. 97 km (c. 2 hours), Lichuan to Xiaohe c. 75 km (c. 3 hours); Lichuan to Moudao c. 42 km (c. 1 hour); Moudao to Xiaohe c. 80 km (c. 2 hours). Also you could travel from Wan Zhou in Chongqing: Wan Zhou to Moudao c. 84 km (province highway, c. 2 hour). You could find a lot of cultivated forest of Metasequoia all the way from Wuhan to western Hubei; but they are no older than 50 years (Fig. 9).

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Figs. 1-9 on pages 33-36.



Fig. 1. Native Landscape of Metasequoia in the hillside at Xiaohe, Lichuan (September 2003).



- Fig. 2. The big tree #2 of *Metasequoia* in Lubeiba at Xiaohe (whole vision), Lichuan (September 2003).
 Fig. 3. The big tree #2 of *Metasequoia* in Lubeiba at Xiaohe (DBH vision), Lichuan (June 2001).





Fig. 4. Cultivated station of *Metasequoia* at Xiaohe, Lichuan (May 2002).



Fig. 5. Native forest of *Metasequoia* around the field and house, Lichuan (September 2003).



Fig. 6. Cultivated forest of *Metasequoia* in the private forests, Lichuan (May 2002).

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- Fig. 7. The type tree of *Metasequoia* in Moudao, Lichuan (September 2003).



Fig. 8. The City Tree of Wuhan - *Metasequoia* at Wuhan Botanical Garden, East Lake, Wuhan, Hubei (May 2002).



Fig. 9. Cultivated *Metasequoia* along the Highway from Lichuan suburbs (September 2003).