

A Report of the Project
on
Population and habitat survey of newly reported *Acer pentaphyllum* Diels in western Sichuan
Province, China

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1. Introduction

Since its first recollection in 1974 but not identified until the late 1980s, *Acer pentaphyllum* has been restricted to a few small areas. It has been found only at five localities in four counties of the middle Yalong Jiang, namely, Yajiang, Kangding, Jiulong and Muli, in northwestern Sichuan Province of China (McNamara, 2010). From the late 1980s and early 1990s, many efforts have been made to explore this species in the region. Prior to the present survey, no new locality has been added, but the number of plant individuals were added, with the total number of plants of around 500, with majority in Yajiang (one population of 261 plants (Sun et al., 2010). In 2021, a local media reported a new locality in Kangding Municipality, but our late literature review and personal communications revealed this locality was not new and many people visited this area located along the Liqiu He, a tributary of the Yalong Jiang. However, those visited this area did not mention population size, with two mentioning 23 plants only (Sun et al., 2010; Zhang and Mou, 2014). With the support of the International Maple Society, we visited this area and promising results were obtained.

2. Field trip

2.1 Population

Until very recently (9 December 2022), travels in China had been difficult easy! After three attempts, field survey was finally made from late October to early November 2022. The first plan was made in mid-August. Unfortunately, one team member could not leave her residence due to local government's strict restriction of people's movement due to some Covid-19 positive records of the community. When the restriction was lifted and the member could leave for field in the early September, an earthquake occurred on the other side of the destination and travel to that region was restricted. Finally, the long-delayed field trip was made from 28 October to 4 November 2022. The delayed trip, fortunately, proved to be more meaningful, as the seeds did not mature in August, but matured during this trip.

Based on the communication with local government in Kangding Municipality and information obtained from some publications, *Acer pentaphyllum* was collected at two villages of the Pusharong Township in the Liqiu He gully. Therefore, we visited these two localities. The first locality was located on one side of the Liqiu He. The other village was on the other side of the Liqiu He. Two localities are around 60 km to the Yalong Jiang. The first locality is located at the Yidai Village, where the township government sits. At this locality, *Acer pentaphyllum* was

found only on the northern side of the Liqiu He. We did not count very carefully for each plant, but rough counting revealed over 60 plants at this site. Some plants with up to 10 stems growing from the base, clearly they were not coppiced stems. Seedlings were not common and saplings were more than seedlings.



Fig. 1. Habitat of *Acer pentaphyllum* at the Yidai Village, Kangding, Sichuan Province, with arrow indicating *Acer pentaphyllum*.

The second locality was located at the Huoshan Village, the southern side of the Liqiu He. There is a population of many mature trees. We counted roughly and there were over 100 trees. Different from the first site, most *Acer pentaphyllum* are trees, some are quite big. There is one small tree just on the roadside or on the river bank. This site is a steep forest, without any signals of obviously disturbance. From the site, with binocular (but local guide identified with naked eyes, many trees and saplings were also found on the other side of the river. It seemed that there should be more plants on that side, as it is at a lower elevation and on the same river side of the first site.

Field surveys at this locality revealed over 500 plants, and many trees had lots of fruit. We saw some seedlings and saplings, but either of which was common. Interaction with the local guide and local villagers suggested this plant is common in the area, and they estimated the number was over 1000 plants.



Fig. 2 Seedlings at the Yidai Village



Fig. 3. Mature trees at Huoshan Village

2.2 Growth

All the trees, except for a few damaged by falling rocks, grew well, without any signs of problems. However, seedlings and saplings were not common. Field survey suggested that poor soil is probably a cause, as the soil was with either lots of gravels and poor soil or lots of herbaceous plants probably prevent seeds germinating from soil. But more studies are much needed.



Fig. 4. Multi-stemmed and fruited trees

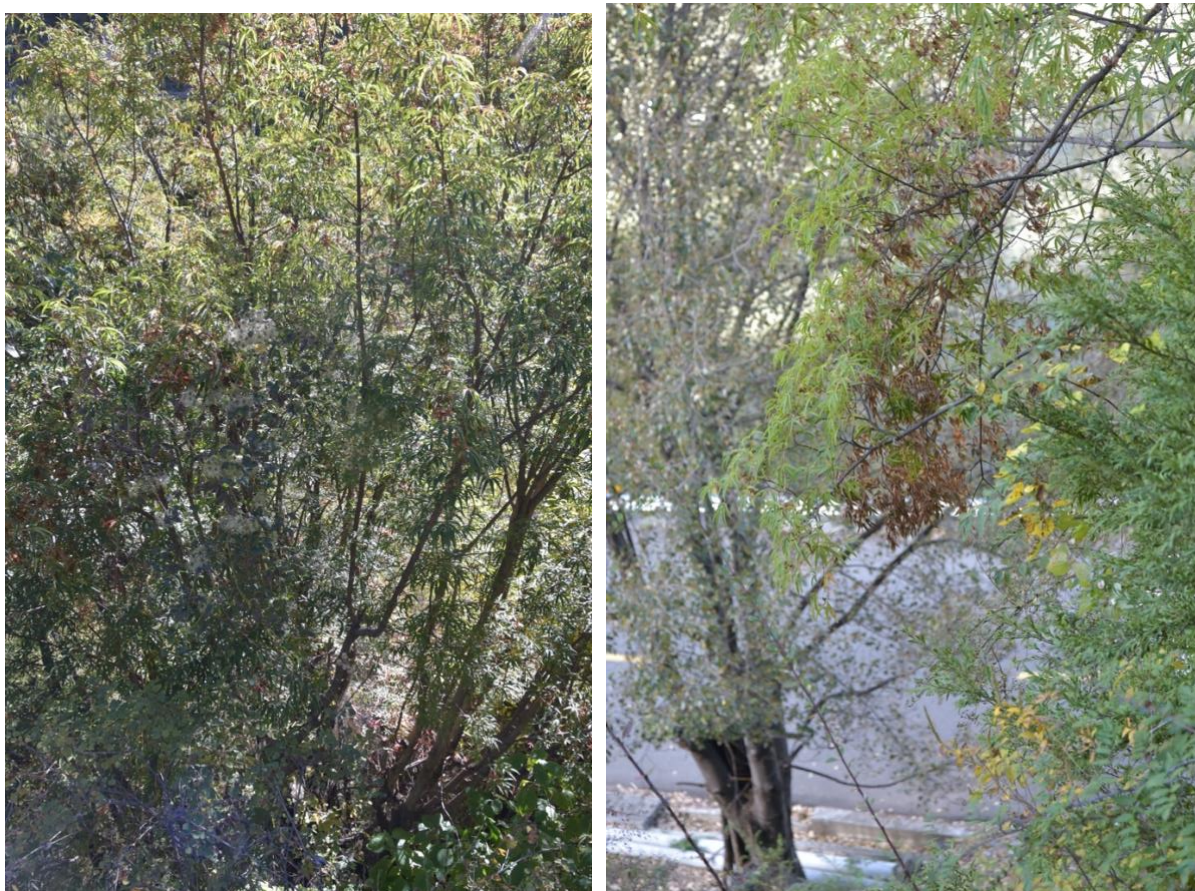


Fig. 5. Multi-stemmed trees and fruiting branch



Fig. 6 Trees at Yidai Village



Fig. 7. Trees at Huoshang Village.

2.3 Plant community

Acer pentaphyllum did not form pure woods but it was a dominant species in only one Huoshan population. At both localities, common tree and shrub species growing with it included *Morus australis*, *Platyclus orientalis*, *Juniperus formosana*, *Acer mono*, *Albizia kalkora*, *Quercus aquifolioides*, *Q. pannosa*, *Pinus densata*, *Buxus sinica*, *Rosa soulieana*, *R. bella*, *Rosa multiflora*, *Sophora davidii*, *Bauhinia brachycarpa* var. *microphylla*, *Elsholtzia fruticosa*, *Acalypha schneideriana*, *Campylotropis polyantha*, *Debregeasia orientalis*, *Rubus niveus*, *Celtis yunnanensis*, *Prunus davidiana*, etc.

Herbaceous species include *Elsholtzia souliei*, *Artemisia sacrorum*, *Leonurus artemisia*, *Rumex hastatus*, *Oxyria sinensis*, *Incarvillea arguta*, *Rabbosia* sp., *Phytolacca polyandra*, *Datura stramonium*, *Corallodiscus cordatulus*, *Circus leo*, *Buddleia davidiana*, *Tetrastigma* sp., *Urtica* sp., *Elsholtzia ciliata*, *Clematis brevicaudata*, *Rhumnus*, *Phytolacca acinosa*, *Berberis thunbergia*, *Cotoneaster* sp. etc.

3. Factors influencing field populations and conservation efforts

Prior studies and investigations have suggested that free grazing, fuelwood collection, road construction and dam construction were the major threats to the conservation of the species (McNamara, 2011). In the past two decades, fast economic development in the region has brought about some important changes that may have contributed to biodiversity conservation in general and conservation of this maple species in particular.

3.1 Fuelwood collection

Mountain inhabitants depend on local plants, especially woody plants to meet their needs for household energy. Fuelwood had been the sole energy for the local people until electricity was available. Today, electricity was used for cooking and heating. Fuelwood was used only for cooking livestock feed and for some events with many people, like wedding or funeral ceremony. Therefore, the need for fuelwood quantity has reduced considerably. As for the tree species used for fuelwood, only two species, namely, *Quercus pannosa* and *Q. aquifolioides*, are preferred to other species. Among the two species, the first one is more preferred as it is easier to split into small parts. These two species are also common fuelwood species in most subalpine and alpine areas, as they burn longer than most other trees, producing more energy and forming less wood ash. Species of the same genus are also the common ones in China for making high quality charcoal. These two species and some other species coppice well and can be managed as fuelwood in many mountainous areas.

Interactions with local people indicated that *Acer pentaphyllum* was rarely harvested for firewood, as there are plenty of the two *Quercus* species. Also, the maple species does not burn as long as the oak species, hence not preferred. It is very clear that firewood collection is no more an important cause of the rarity of the species.



Fig. 8 Fuelwood of *Quercus pannosa* and *Q. aquifolioides* of a local family.

3.2 Grazing

Animal composition of livestock has changed greatly in China in the recent three decades. In the areas where the maple species are located, the main livestock animals include cattle and goats. We noticed that leaves of *Morus mongolica* were collected as fodder. *Acer pentaphyllum* growing in open areas might be affected by open grazing of cattle, but those in slopes might not be affected the same way.



Fig. 9 *Morus mongolica*, with leaves collected as fodder

4. Local efforts of ex situ and in situ conservation

With the efforts of many people informing local government officials about the importance of protecting and conserving *Acer pentaphyllum*, it was listed recently as a national protected wild plant species by the Chinese government in the revised list of national protected wild plant species in. In addition, with many efforts by many people, the importance of this species has been quite widely recognized in local villages. Many efforts have been made in collection of seeds and raising seedlings. So far, seedlings have been distributed to some places. A few NGOs collected seeds and seedlings were transplanted. Nowadays, this species is cultivated in many botanical gardens in China. In Jiulong County, local forestry bureau supported a local farmer to establish a nursery and up to 30 000 seedlings were raised and transplanting was planned for

20 ha (Zhang and Mou, 2014). In addition, around 8500 seedlings were raised and transplanted in Tianshui of Gansu Province.

Economic development and lifting up of life standards in the region have also contributed to reduced threat to this species. As this is a region lacking coals, biomass or fuelwood has been the most important or sole household energy for them for a very long. With economic development, local farmers' economic status has been much lifted up. Enhanced household income of local people has commercial energy affordable. In the past 20 years, government has made electricity available. Electricity has become so common and can meet almost all the demands of daily crooking requirements. Electricity is also used for heating during winter, with a special type of electrical heating stoves. Each local farmer household has many different varieties of kitchen utensils which use electricity. Fuelwood is needed only for livestock feed preparation. Use of improved stoves is common, which consumes less firewood. Therefore, they no longer depend on fuelwood to cook food anymore. They use fuelwood mostly for cooking livestock feeds. Decreased harvesting of fuelwood has contributed greatly to conservation and protection of local vegetation.

5. Suggestion

Financially constrained, we could not spend more days in the field to explore other potential areas and to carry out detailed survey of population size. A future long duration survey is suggested in this area.

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