

**FLORAL EXPLORATION OF SW YUNNAN CHINA June 23-July6 2018 PART 2**  
**PART2 PUJING LA NEAR BAIMA SNOW MOUNTAIN compared to THE PACIFIC NORTHWEST**



*Washington State Cascade Mountain Range: Glacier Peak , Mt Rainier, Forests of Olympic National Park N America*

I was hoping to document primarily alpine flora, which I am familiar with in the Pacific Northwest from Washington State along the coastal range to SE Alaska and Glacier Bay National Park. The comparison of diversity was amazing from what I had read: The Pacific northwest has 5 species of rhododendron including Labrador tea *Ledum groenlandicum* (N America 27 species total) in contrast to Yunnan with 226 species. The root parasite flowers *Pedicularis* (Scrophulariaceae family now with species placed in Orobanchaceae) seen in the Washington cascades that include elephants head and lousewort in N America numbers 37 species



Top: North America Olympic National Park WA Sitka spruce (*Picea sitchensis*) with the largest recorded 96m (317 feet) height and diameter of 5.3 m (17.5 feet) and Western Red Cedar (*Thuja plicata*) largest recorded 7m (20 feet) diameter and a height of 65m (213 feet) tall. Middle Sitka spruce in the Quinault Rainforest Pac NW with the tree 58 m (191 feet) height and 5.3m (17.5 feet) diameter. The rare Chinese coffin or Taiwan cedar *Taiwania cryptomerioides* in the Cypress family related to the western red cedar is here photographed in Gaoligongshan Yunnan. Oldest trees dates 1800 years, size up to 3.6 m (12 feet) diameter, 65 m (215 ft h). In contrast the Pacific Northwest North American Douglas Fir (*Pseudotsuga menziesii*) with a relative in Yunnan can reach up to 99 m (327 feet) height and the California redwood (*Sequoia sempervirens*) at 115 m or 380 feet. These trees rival the large *Shorea* spp. trees found in tropical Asia



North American Cascade Range: Indian paintbrush in the family Scrophulariaceae (Orobanchaceae) which includes Pedicularis and elephantshead) represented by only a few species in the Pacific Northwest in contrast to 216 species in Yunnan China. Indian paintbrush with lupine (legume family,) ,bistort and arnica. Rt: native azalea (*Rhododendron occidentale*). Bottom *Rhododendron macrophyllum*, one of five species in the Pac NW versus 221 species in Yunnan. Rt Tiger lily Liliaceae North Cascades Washington. Yunnan china in contrast has one of the greatest temperate lily diversity with 46 species of *Lilium*.



Yunnan, China Meili Snow Mountains with Kawagebo right 5128m (16,990 feet)



*Baima Snow Mountain from pass near Pujing la and Meili Snow Mountains to the west.*



*There are 226 species of Rhododendron in Yunnan alone compared to the Pacific NW 5 species*



*Great diversity in the 56 species of lilium Yunnan which is far greater*



*Pedicularis spp., Primula calliantha, Primula secundiflora Pujing la Yunnan*

contrasted to 216 species in Yunnan. And this doesn't include the tremendous variety of primulas, gentians, and composites, and the tremendous diversity in trees in Yunnan. The montane and alpine forests have greater diversity of conifers from true firs, larch, spruce and pine to broadleaves that include hardwoods such as oaks, maples, ash and hickory. The valleys are known for the great variety of Asian tropical species that vary from seasonal to wet seasonal rainforests that include laurels *Lauraceae*, figs *Moraceae*, elms *Ulmaceae* and custard apple and magnolia family *Annonaceae* in the seasonal, and Wet seasonal dominated by spurge (cassava and rubber trees, euphorb tree family) *Euphorbiaceae*, soapberry family (chestnut, maple, rambutan) *Sapindaceae*, and sal or dipterocarp family *Dipterocarpaceae*.

I had just finished exploring both south and northern Gaoligongshan on the Burma border to the east before leaving for the Meili Mountains above the Mekong River. Meili in Deqen County is reached by traveling three days flying north from Kunming to Lijiang, Yunnan China, then a two-day drive to Deqen where we would begin from Songtsam Meili lodge at 3,600 meters (12,000) feet that faces the Meili mountains. Mr Dorje has designed a series of lodges that incorporate his love for the Tibetan cultural roots of his family, and with his creativity and desire to secure landscapes that capture the beauty of its mountains, forests and rugged terrain, desired to blend a peaceful setting with a welcoming family at each lodge. He has created and developed an amazing series of lodges that will be completed in 2019, from Lijiang, Yunnan to Lhasa Tibet. The traveler can follow along a section of the ancient Tea Horse trail starting in Lijiang and the area of the three parallel rivers, a UNESCO Heritage Site through the remote and scenic Kham Mountains of eastern Tibet to Nyinchi then Lhasa.

Meili would be our base to explore the Pujin la near the Baima snow mountain range. Baima Snow Mountain stands in the mid-section of the Hengduan Mountain range in southeast Deqen of Yunnan Province, between the Jinsha and Lancang rivers. Most of its perennial snow-capped peaks are over 5,000 meters. Zhalaqueni, the highest peak of Baima Snow Mountain is 5,640m above sea level, while Xiaruoxiang, the lowest point, is 2,080m. From afar, the peaks look like a cluster of hurtling snow-horses, hence the name "Baima (white horse) Mountain" by local Tibetans. On its west and east are deep canyons carved from the Lancang and Jinsha rivers, while on the bank opposite the Lancang River are the 13 peaks of the Meili Snow Mountain.

Pujin la encompasses a high-altitude basin of shale and sedimentary rock with unusual alpine plants that include several species of blue poppy *Meconopsis spp* that I hoped to find and photograph. In the late spring of 1913 the British explorer Eric Bailey collected and pressed a specimen from the Tsangpo region of Kham southeastern Tibet. It was named *Meconopsis betoncifolia baileyi* after him and raising considerable interest with British Royal Horticultural Society. At the height of the plant-hunting era a century or so ago, British commercial botanical gardens such as those at Edinburgh and Kew, commissioned explorers to penetrate unknown, and often dangerous, lands in search of new species that could be grown in the UK. The plant-hunters brought back exotic species that are familiar in our gardens today; lilies, azalea, camelias, clematis and peonies. Following the route given by Bailey, botanist Frank Kingdon-Ward found and collected seeds in 1924 and is credited with introducing the blue poppy to European gardens. Also, famous, Joseph Rock, an Austrian-American eccentric, carried out



*Pujing la from 4500 meters, and bottom 5000 meters. Rocky shale and dry substrate.*

plant-hunting expeditions in Yunnan between 1922 and 1949 (when he was forced abruptly to flee as Mao's revolution created the People's Republic). Undaunted by bandits roaming the hills, winter blizzards, landslides and the effects of altitude, Rock would set off from his base in Lijiang, assisted by local Naxi men and nomadic Tibetan escorts. He collected sacks of seeds and roots to ship back to his patrons and is reputed to have brought back nearly 500 species of rhododendron from a single expedition. George Forrest (1873-1932) also became a famous Scottish botanist from his explorations and plant collections of Bhutan, Tibet and Yunnan.

Timing is critical to catch the peak flowering season in the mountains as snowpack can vary year to year as well as the arrival of the monsoon. Rhododendron blooming vary with altitude and species and in Gaoligong we were about one week late for the peak at 3500-4500 meters (11,596-14908 feet). Monsoon season in Yunnan normally begins in June where almost every day is wet. The warm rains come up from the south from the Bay of Bengal, supporting a verdant and tremendous temperate plant life diversity. And it means slippery mud trails, high rivers, biting gnats, and leeches. But it brings out flowers and the blue poppy.

We gathered our gear at Songtsam Meili and drove by Toyota prada 4x4's east towards the pass, then north into the mountain range immediately east of Songtsam in a drier climate north



*Pujing la basin immediately south of Baima Snow Mountain, east of Songtsam Meili. High altitude shales 4700m*

of Baima snow mountain. Ascended the valley of Yak pastures and at 3800 meters (12590 feet) found beautiful fields of yellow and wine-red primulas *Primula secundiflora* and *P sikkimensis* (yellow) in a wet stream area in a stunted oak forest *Quercus pamosa*. There was bearberry familiar in the Pacific NW *Berberis* sp with a root used for diarrhea, and purple columbine *Aquilegia* sp with flower tips resembling that resemble a Tibetan yak horn, and the yellow poppy *Meconopsis intregifolia*. I could see the impacts of decades of yak grazing on this valley, and both forests and flower diversity were missing. Ascending up the valley where we began to see more azaleas and a few species of rhododendrons, one with a light pink in color *Rhododendron primulaeflorum*, while higher up the azaleas both were purple-lavender *Rhododendron achroanthum*, and light-yellow *R rupicola*. Saw also a rare and protected buttercup like leaves and purple anemone like flowers. It was fortunate we had Dr Pan with us to interpret the huge variety of plant species, about 45 of them I had never seen.

Exploring the drier shale slopes between 4200-4700 meters (13,915-15,571 feet). I finally saw the deeper blue poppy, *Meconopsis horridula*, and the beautiful ice blue *Meconopsis aculeata*, a rare plant in drier mountain locations. Alpine flowers in the drier shales are designed to withstand periods of drought, and vary in structures varying from small sized to thick waxy leaves. The colder temperatures influence which species are able to exist and reproduce at higher elevations. Some plant species on exposed sites at high elevations have hairy leaves such as the sweater or snowball plants that are covered with dense hairs like *Saussurea medusa*. Others protect flowers and seeds with hairy stamens and flower parts like the composite *Asteraceae* family *Saussurea spp* with over 100 species in the Henguan Region in comparison to 289 species for all of china, or what are called greenhouse plants as in the case of some *Saussurea* (ie *S obvallata*) and *Rheum alexandrae*, which have leaf hoods, leaves, bracts or floral parts enlarged to cover flowers, increasing temperatures inside the flower cluster maturing seeds faster. And there are alpine plants like *Corydalis benecincta* not unlike stonecrop *Sedum spp* in N American cascades with thick fleshy leaves with waxy covering. But there are also some tropical plant families with genera and species that are adapted to alpine regions such as in the *Bignoniaceae* or bignonia family *Incarvillea spp* and *Roscoea coutleoides* and *R tibetica* (4,000m).

Dr Pan shared his passion to document as many flower species as he could up to 5000 meters, which included *Potentilla stenophylla* yellow flowers at 4600 m, *P. Galbra* 3500 m, *Corydalis benecincta* at 4800m (15,902feet), Onion family *Allium sp* 4700 m (15,571 feet), the lily *Fritillaria cirrhosis* 4200 m, *Salvia sp*, *Lamiophomis rotata* with broad flat leaves and pink flowers, and *Andromache sp*. Amazing flower diversity in such a high-altitude drier shale mountain grassland.





### Kalimantan, Indonesia

-  
540,000 km<sup>2</sup>  
Around 11-15,000  
species of plants  
(0.0203-0.0207  
spp./km<sup>2</sup>)

### Hengduan Shan

-  
500,000 km<sup>2</sup>  
Around 10,000  
species of plants  
(0.020 spp./km<sup>2</sup>)

(All of China = 9.6  
million km<sup>2</sup>)



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### Number of Species Hengduan Mts / Nepal / Japan / N America

Genus	Hengduan	Nepal	Japan	N America
<i>Rhododendron</i>	226	32	51	27
<i>Pedicularis</i>	216	63	15	37
<i>Saxifraga</i>	132	77	16	25
<i>Gentiana</i>	117	43	15	30
<i>Primula</i>	113	59	14	20
<i>Aconitum</i>	104	31	23	10
<i>Salix</i>	103	30	38	113
<i>Saussurea</i>	101	34	25	7
<i>Corydalis</i>	91	32	13	9
Totals (9 genera)	1,203	401	210	278

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Family Asteraceae: *Aster* spp also seen in the North Cascades N America, *Saussurea* spp. unique to this area



Diversity in *Pedicularis* (Orobanchaceae) – 215 species



Above: Powerpoint slide by Dr David Bouchard, Harvard University with permission, *Pedicularis* spp. Pujing la

Greenhouse Plants  
(温室植物)

Plants with leaves, bracts or floral parts enlarged to cover flowers/inflorescence



*Rheum alexandrinum* Hatalin






*Androsace spinulifera*



*Primula secundiflora*



*Primula blinii*



*Primula nutans*



*Primula florindae* and *P. alpicola*



*Androsace delavayi*

**Diversity in Primulaceae – 113 species of *Primula***



Powerpoint slide by Dr David Bouchard, Harvard University with permission , Bottom: *primula palmata*, Pujing la



Top Pujing la at 4700 m (15,571 feet); Middle: *Rhododendrons achroanthum* 4500m, Bottom: *Lilies* spp, *Lamiaceae* *Phyllophyton complanatum* (Qiao yang photos)



Left: ?, *Lamiales Salvia* sp., Right: ?



*Fabaceae Caragano jjubata, Iris spp., Poppy family Papaveraceae: Meconopsis horridulis*



*Figwort family, Pedicularis spp, Poppy family Papaveraceae Corydalis spp.*



*Poppy family Papaveraceae: Meconopsis horridulis, M integrifolia far right*



Poppy family, Papaveraceae, *Meconopsis horridulis*, Primulaceae, *Primula*



Saxifragaceae *Bergenia purpurascens* 4500 m, Ranunculaceae *Paraquilegia microphylla* 3500m Pujing Lang

