

The Meconopsis Group

Report of talks by Toshio Yoshida at The Royal Botanic Garden Edinburgh on 8th May 2010

We were delighted to welcome Toshio Yoshida, the eminent plant photographer and field botanist from Japan, for a special meeting of The Meconopsis Group. Toshio gave two very interesting talks profusely illustrated with excellent slides, not only of *Meconopsis*, but also of many other beautiful plants growing in the areas he visited over a period of 4 years. One talk was in the morning. This was followed by our usual bring-your-own lunch, with the opportunity for discussion and to have a look round the Garden. The second talk followed in the afternoon. The talks were also well illustrated (making good use of the advantages of Powerpoint and Google Earth maps) with informative maps and with photographs to show taxonomic details of the *Meconopsis* species Toshio discussed.

Talk 1

Quest for *Meconopsis* in Yunnan, 2006-2009

(written up by Toshio Yoshida and lightly edited by Evelyn Stevens)

Topography

The region of exploration, northwestern Yunnan, located in the core area of the Sino-Himalayan floristic region, is said to be the most prominent 'hot spot' of biodiversity in the temperate world.

Four big rivers, Jinsha Jiang (Yangtse), Lancang Jiang (Mekong), Nu Jiang (Salween), and Dulong Jinag (Irrawaddy), flow north to south within a narrow band of this region. Between Jinsha Jiang and Lancang Jiang run the mountain ranges of Yunling and Cang Shan. Between Lancang Jiang and Nu Jiang runs a single mountain range named Nu Shan. The northern and higher part of this range is called Meili Xueshan and the southern and lower part of the range is called Biluo Xueshan. Between Nu Jinag and Dulong Jinag runs Gaoligong Shan along the boundary between Yunnan in China and Burma except the northernmost and the southernmost parts that are situated within Chinese territory.

Slide show of the botanical explorations for *Meconopsis* and other plants.

1. The western slopes of Cang Shan. 12 – 16 April, 25 – 27 May, 12 – 15 June, 2006

The speaker visited this area three times in the same year because he encountered an unknown species of *Meconopsis*, which was later named *M. wilsonii* subsp. *australis* by Christopher Grey-Wilson. The flower colour is dull wine-red in this region.

2. Tsema La, on the northernmost Gaoligong Shan, SE Tibet. 30 July – 5 Aug., 2008

On stony alpine slopes of this region grow many Himalayan plants that are rare or absent in the southern part of the same range within Yunnan. Photographs of many of these were shown. The speaker encountered numerous plants of *Meconopsis impedita* around Tsema La and observed quite a wide variety in the shape of the leaves of this species.

Then he encountered many plants of *M. racemosa (prattii)*. Later he realized a relationship between the flower colors of this species and the rocks surrounding the plants, as follows:

*According to the laboratory studies of Kumi Yoshida, a Japanese chemist, blue poppies need an adequate amount of the element iron in the soil to appear in shades of deep-blue colour.

*However, most *Meconopsis* with deep-blue flowers grow on and around the Tibetan plateau where it is rich in limestone derived from the Tethys Sea. The form in which iron is present in such a limestone soil is insoluble.

*By the analysis of petals and rocks collected in this region, it was found that most of the plants with deep blue flowers do not grow on the limestone, but actually on mudstone (including shale) which is rich in iron. These mudstones are often covered with reddish iron-oxide.

*We should note also in thinking about flower colour that the deep blue of the petals is related not only to the presence of iron in the soil but also to the strong sunlight on the dry Tibetan plateau.

3. Doker La, at the southern shoulder of Meili Xueshan. 12 – 17 Aug., 2008

Here the speaker encountered *Meconopsis speciosa*. He observed that this species has 4 (rarely 5) petals of pale blue colour and that they never appear deep blue. Later, by analysis of the surrounding soil and rocks, the speaker realized that this species grows almost always on limestone scree containing only small amounts of iron. This species, where it occurs in Yunnan, has pinnate leaves with a characteristic rounded shape at the tip of lobes and also around the sinus. This does not apply to very similar plants from Tibet (which are *M. cawdoriana*).

4. Shi La, on northern Biluo Xueshan. 19 – 20 Aug., 2008

Here the speaker encountered several plants of *Meconopsis compacta*, which was included in *M. lyrata* by George Taylor.

5. Laowo Shan, on central Biluo Xueshan, 1 – 3 May, 2007

Here the speaker encountered rosette leaves of a large *Meconopsis* resembling those of *M. wilsonii* subsp. *australis*, and decided to revisit in the flowering season.

6. Laowo Shan, on central Biluo Xueshan, 21 – 23 June, 2007

After 50 days from the previous visit to the habitat, the speaker enjoyed seeing *Meconopsis wilsonii* subsp. *australis* in full bloom. The flower colour in this region is rose pink with a slightly bluish tint. The pinnate leaves of the large plant growing here have 7 pairs of lobes unlike the description by C. Grey-Wilson.

After crossing over the ridge, the speaker encountered an unusual plant of *Meconopsis* with maroon coloured flowers on a western slope of the range. He was convinced that it would prove to be a new species and later named it *M. castanea*.

7. Laowo Shan, central Biluo Xueshan, 14 – 17 July, 2008

The speaker visited Laowo Shan again to collect specimens of *Meconopsis castanea* in collaboration with the Kunming Institute of Botany and searched for it widely over the range. He observed the habitats as follows: the plants are scattered on steep rocky slopes that are under the influence of a very rainy microclimate in summer. They root deeply into well decomposed blackish soil among large granite boulders that are partly covered with mosses and lichens.

8. Xinhua Pass (Fuchuan Shan according to George Forrest), on the northern shoulder of Laowo Shan. July 22-25, 2009

By investigation of a locality written in Chinese letters on the label of an old herbarium specimen, which is quite similar to *Meconopsis castanea* and has dark red flowers according to the memo on the label, the speaker climbed Biluo Xueshan in search of living plants of the specimen from Fuchuan, an old town situated on the western river terrace of Lancang Jiang, and reached the ridge via Xinhua village. He found plants similar to *M. castanea* at the locality given on the old herbarium specimen. The colour of the flowers, that were then at the end of flowering, is, however, not maroon or dark red but pale blue or pale pink with a tint of dark red only at the base of petals.

9. The southernmost Biluo Xueshan in Bijiang region. 13 – 18 Aug., 2007

Here the speaker encountered plants of *Meconopsis wilsonii* subsp. *australis* at the end of their flowering with many young fruits. Then he encountered an unknown species of *Meconopsis* having large cylindrical fruits and the remaining few flowers with 4 pale mauve petals. He was convinced this was a new species and later named it *M. bijiangensis*.

On stony alpine slopes near the ridge at the southernmost of end Biluo Xueshan, he observed many Himalayan plants, such as *Rheum nobile*, *Chionocharis hookeri*, *Saxifraga brachypoda*, *Sedum trullipetalum* and *Bistorta macrophylla*. These Himalayan plants are very few or absent in the northern, higher part of the same range, which is supposed to have been wholly covered with ice in the cold ages of the Quaternary. In such cold ages, these plants seem to have migrated to the south along a corridor of the range and survived only on exposed stony slopes near the ridge. This is believed to be why the Bijiang region has a unique and rich alpine flora.

10. The southernmost end of Biluo Xueshan in Bijiang region. 7 – 11 July, 2008

The speaker revisited this region to collect specimens of the new species, *Meconopsis bijiangensis*. On a flank of the range he observed *M. wilsonii* subsp. *australis* with blue flowers. Then he observed many plants of *M. bijiangensis* in full bloom, and realized as follows;

*The plants often grow gregariously on west facing (Nu Jiang side), gentle, stony slopes near the ridge, rooting into thick, dried, peaty soils derived from half decomposed mosses and other plants, sometimes growing among dwarf shrubs of *Rhododendron*, just above the steep head of valleys where ascending foggy winds from the southwest summer monsoon gather and swiftly flow over the slopes supplying the plants with plentiful water. No plant of the species was found on the eastern slopes of the range.

*A few dwarf species of *Rhododendron*, such as *R. rupicola*, grow gregariously on the steep slopes near the ridge with numerous flowers opening in summer.

*Bumblebees frequent the flowers of dwarf *Rhododendron*, which have a lot of nectar and pollen. The flowers have showy red corollas and display yellow anthers protruded from the corolla.

*Bumblebees have to feed their larvae in underground nests in summer with balls made of pollen and nectar collected from numerous flowers such as dwarf *Rhododendron* that open simultaneously in this season.

*Unlike honeybees, bumblebees living in colder, higher areas of the mountains can stock nectar in the large honey sac within their belly and also pollen in the basket surrounded with barbed hairs on a bare part of their legs. Therefore they can make long trips to the flowers of the same species scattered on alpine slopes resulting in pollination of the flowers and the carrying of pollen balls to their nests far away from the visited flowers.

*Bumblebees can swiftly collect pollen and nectar in a passing moment of fine weather during the rainy season owing to their lengthy flights, rounded bodies with less resistance against winds, and large bodies covered with long hairs to keep them warm when suddenly entering into freezing shadows.

*The bumblebees occasionally visit the inconspicuous flowers of *Meconopsis bijiangensis* growing among dwarf shrubs of *Rhododendron*. They can dangle and cling to the sexual organs of nodding flowers of *Meconopsis* and receive pollen with their hairs. The pollen is released from the anthers with a vibration caused by active movements of the bumblebees.

**Meconopsis bijiangensis* seems to have evolved together with the bumblebees, dwarf *Rhododendron*, and the monsoon climate on the isolated ridge of the southernmost Biluo Xueshan.

Then, he encountered another unusual plant of *Meconopsis*. The plant seemed to be closely related to *M. lyrata*, but appeared different from the latter in some characters. He provisionally named it *M. exilis*.

The plants of *M. exilis* are scattered on steep slopes densely covered with tall herbs such as *Anemone*, *Potentilla*, *Nomocharis*, *Salvia*, *Phlomis*, *Geranium*, *Angelica* and *Ligularia*, and the habitats are often shrouded in dense fogs brought by the summer monsoon.

There followed a section of comparative studies, showing Toshio Yoshida's conclusions with the help of a series of juxtaposed photographs.

1. *Meconopsis wilsonii* C. Grey-Wilson subsp. *australis* C. Grey-Wilson

The flower colour of this subspecies is changeable according to the region where it occurs. For example, the flowers on the western slope of Cang Shan are dull wine-red, those on the eastern slope of Biluo Xueshan near Laowo Shan are rose-pink with slightly bluish tint, and those on the western slope of Biluo Xueshan near Bijiang are blue.

2. *Meconopsis bijiangensis* H. Ohba, T. Yoshida & H. Sun

From *M. speciosa*, the leaf shape of this new species is clearly different. From *M. racemosa*, the flower shape, the number and colour of the petals, and the bases of the spiny hairs are different. The habitat of *M. bijiangensis* is also clearly different from both related species.

3. *Meconopsis castanea* H. Ohba, T. Yoshida & H. Sun

From *M. speciosa*, the leaf shape and the number and colour of the petals are different. From *M. bijiangensis*, the number and colour of the petals are different. The habitat of the *M. castanea* is also clearly different from both related species.

Finally the speaker showed many photos of related species in Series Aculeatae including *M. rudis*, *M. impedita* and *M. lancifolia*, showing maps of their distributions in this region.