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Recent Developments Concerning the Classification of Section Moutan or (The World of Tree Peonies According to Hong and Hong)

by D. R. Smith

Two recent studies by Hong et al. (1997, 1998) have shed new light on the classification of *Pæonia*, section *Moutan*. The first of these studies deals primarily with the taxonomic status of *P. lutea* var. *ludlowii*, while the second addresses the sub-division of the *delavayanae* sub-section of section *Moutan*. Although the results of these studies are not nearly as definitive as those for section *Pæonia* recently reported by

Tao Sang (see previous issue of the newsletter, V30, N3), they are nonetheless based on extensive field observations, population sampling and analysis of several plant characteristics. Together, these studies arrive at several new and interesting conclusions that are well worth summarizing here.

Compared to section *Pæonia* (which contains approx. 28 species), I would have assumed that classification of section *Moutan* (with only ~ 6-9 species) would be considerably easier. In practice, however, this has not proved to be the case.

Section *Moutan* is composed of a relatively small group of woody peonies that are endemic to China. This section is divided into two sub-sections (*Delavayanae* and *Vaginatae*). Within each of these sub-sections are smaller groups of

allied "species" sometimes referred to as complexes.

One such group is the *Delavayi* complex with members that are endemic to southwestern China. This complex includes *P. lutea*, *P. delavayi* and *P. potaninii*. Another such group is the *Suffruticosa* complex, which includes *P. rockii*, *P. ostii* and *P. qiui*, etc. This group is endemic to north-central China.

Classification of the *Paeonia delavayi* complex has been especially problematic due to a significant lack of agreement among the taxonomists who have studied the complex. Some taxonomists recognize one species with three infraspecific taxa, while others accept only two species, and yet others accept three species with two infraspecific taxa. Hong's results show that the complex is extremely variable both within and between populations in the number, length, and width of leaf segments and in the number, size and color of the floral parts. Hong and his co-workers concluded that only one species should be recognized, without any infraspecific taxa. As a result *Paeonia lutea* and *Paeonia potaninii* are reduced to synonymy of *Paeonia delavayi*.

In all, eighteen populations were studied in the field. From these extensive field studies, the following observations were made.

Plants of the *Paeonia delavayi* complex are always dwarf shrubs. The tallest being less than 6 feet in height while the shortest rarely reach 3 feet. Seedlings were very rarely found in the field indicating that vegetative reproduction is probably predominant in the *Paeonia delavayi* complex. Cloning by stolens, however, was very common and was found in every population visited.

P. potaninii (along with its two varieties *alba* and *trollioides*) has long been considered to be a separate species within the *delavayi* complex. One of the main justifications for treating *P. potaninii* as a separate species was that it was considered to have narrower leaf segments than *P.*

delavayi and *P. lutea*. However, leaf segments were found to vary greatly within the *delavayi* complex and plants of *P. potaninii* were found to fall in the middle of the overall variation range in the complex. The same situation was found for the length of the leaf segment as well. Therefore, it would appear that *P. potaninii* is rather similar to *P. delavayi* and *P. lutea* in this regard, and thus this character cannot be used to justify a species status for this taxon.

The major conclusions of the Hong et al. study on the taxonomy of the *delavayi* complex are quoted below:

"In summary, the *Paeonia delavayi* complex exhibits tremendous and continuous variation in characters of the leaves (number, length, and width of segments), bracts (number), and floral parts (color and number). Except for the very weak correlation between petal color and geography, the variation in these characters is clearly insignificant taxonomically. Therefore, none of these characters can be considered as justifying the subdivision of this complex, which we thus consider as comprising only one species, without infraspecific taxa."

Another problem with the classification of section *Moutan* is the taxonomic rank of *P. lutea* var. *ludlowii*. Although this "variety" has long been considered to be a sub-species or variety of *P. lutea*, according to Stern and Taylor (1951, 1953), this taxon is distinctly different from variety *lutea*, especially in plant height, size of flowers and number and size of follicles. Examination of plants in five populations by Hong (1997), have confirmed these differences. These observations indicated that plants of *P. ludlowii* are tall (6-11 feet), caespitose, and have larger, pure yellow flowers, yellow filaments, acuminate leaf segments and lobes, and mostly one carpel per flower (more than 97% of the flowers examined had a single carpel and less than 3% had two carpels). Furthermore, *P. ludlowii* produces very large follicles (up to 3" long) that contain the largest seeds (ca. 1.3 cm diameter) in the genus. In contrast, plants of *P. delavayi* are not caespitose, have much shorter stems, acute leaf

segments and lobes, more or less pendulous and smaller flowers on curved pedicels, yellow petals nearly always red-blotched at the base, purple-red filaments, and 3 or 4 (but rarely 2) much smaller carpels. In addition *P. ludlowii* was found to be obligately sexual with no vegetatively produced individuals or plantlets found in any of the populations. This is in sharp contrast to *P. delavayi*, which reproduces both sexually and vegetatively. Furthermore, in several *delavayi* populations no seedlings were found, indicating that these populations were formed primarily by cloning. It is Hong's opinion that these differences clearly support the recognition of variety *ludlowii* as a distinct species (i.e., *P. ludlowii*).

Based on Hong's extensive observations, a brief description of *P. ludlowii* highlighting the major differences with *P. delavayi/lutea* is given below:

P. ludlowii is a tall shrub that often forms large and dense clumps with dozens of stems. *Ludlowii* is distinguished by its long, commonly unbranched stems to 8 feet (vs. 5 feet in variety *lutea*) larger and more open flowers (up to 5" vs. 3" for *lutea*), and up to 2 carpels twice as large as those of variety *lutea*. There are usually 4 flowers to a stem.

The situation in sub-section *Vaginatae* is only slightly less complicated. Here again, recent developments have dramatically changed the "generally accepted" picture of this group of peonies. Until quite recently, it was thought that only one species, namely *P. suffruticosa*, existed within this sub-section. In 1992, however, a group from the Chinese Academy of Forestry in Beijing led by Professor Hong Tao (not to be confused with Hong De-yuan mentioned earlier) proposed a radically new classification system for tree peonies. Hong's principal assertion is that numerous plants previously designated as *P. suffruticosa* are in fact really cultivars developed in China and Japan over several centuries and were derived from various crosses between four wild species (now expanded to 6 or 7) newly described by him and his associates.

These species are:

1. *P. jishanensis*
2. *P. ostii*
3. *P. rockii*
4. *P. yanensis*

To these should be added *P. szechuanica* and another recently discovered tree peony with red flowers, *P. qiui*. This new species was recently described by Pei and Hong (1995). There may also be a seventh species, *P. yunnanensis* first described by Fang in 1958, but this may also be synonymous with *P. yanensis* listed above. The classification tree for section *Moutan* based on the recent work of Hong and Hong is shown in Fig. 1.

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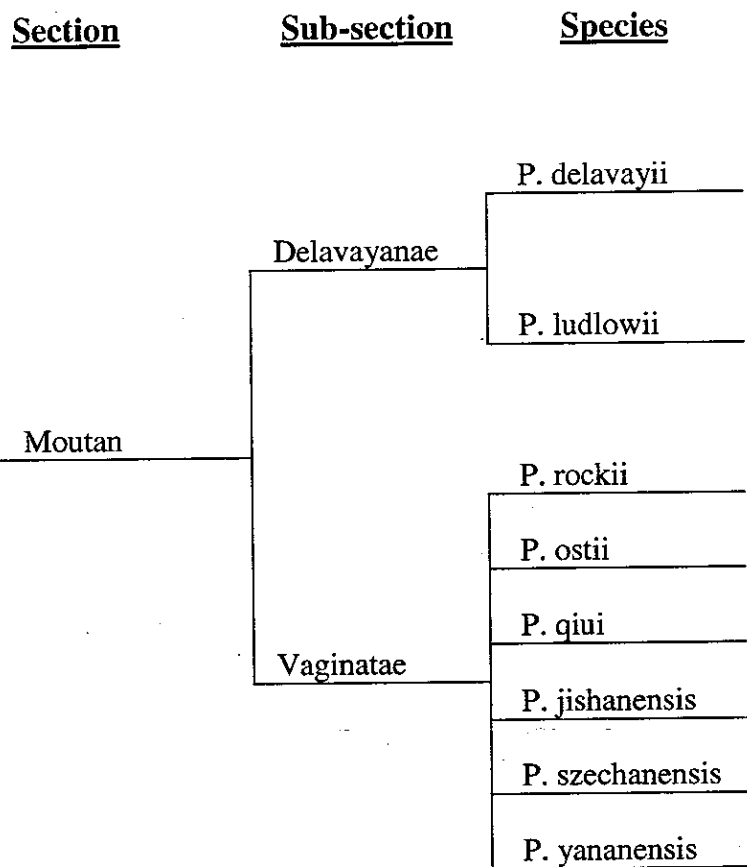


Fig. 1 Phylogentic tree of *Pæonia* section *Moutan* based on the studies of Hong¹ and Hong² et al.

¹Tao; ²De-yuan