

Two Thousand Years of Peonies: Lessons for Alaska Peony Growers

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In Alaska, peonies have been a favored garden flower for more than sixty years, but worldwide their cultivation history is much longer, with evidence of their extensive use as long as 2,000 years ago and even longer. Peonies belong to the family Paeoniaceae and the genus Paeonia, which includes a number of species and cultivars. Both tree and herbaceous peonies are perennials, but tree peonies, which grow to eye level on woody stems with few branches, are not used for cut flowers. Herbaceous peonies are bushy plants, with green, pink, or red stems that grow two to four feet tall. The herbaceous peony, known as the "queen of flowers" in China, has been cultivated there for 2,500 years; the tree peony, or "king of flowers," has been cultivated in China for 1,500 years. The tree peony is not winter hardy enough to withstand Alaska's cold weather; however, herbaceous and some hybrid cultivars are.

The UAF School of Natural Resources & Agricultural Sciences and Agricultural & Forestry Experiment Station have been working for the last decade on a long-term project exploring the potential for the cut flower market in the 49th state—which looks to have significant potential. For more information, please see the listing at the end of this article and the links below:

Alaska Peony Growers Association
www.alaskapeonies.org

**Georgeson Botanical Garden UAF
peony research listing**
<http://georgesonbg.org/research/peonies/index.html>

From January 15 to April 30, 2012 I took a relatively short sabbatical to China, collecting impressions about China's peony research and commerce. I gained information about the peony market, and established personal connections with researchers and peony growers in China. The Alaska peony industry has been growing rapidly in recent years due to the state's unique flowering time (late June to September) and the demands of the market for these flowers. This flourishing new industry needs information to improve peony production in the state.



Dual color (chimera) flower in Luoyang commercial peony garden. This cultivar dates back from the Song dynasty (960–1279), and is one of the major tourist attractions in the garden.

—PHOTO BY MINGCHU ZHANG

Cultural history

China has more than 2,000 years of peony cultivation history. In the Tang dynasty (618–907), Luoyang was already famous for its tree peonies. A couple of poems written by different authors living during the Tang dynasty paint a picture of how popular the tree peony was in the northern part of China by that time.

The Red Peony

by Wang Wei*

*Voluptuous green so leisurely and tranquil
and robe of red now light, now dark
heart of the flower sadness about to break
but how could we know this from such spring colors.*

Drinking with Friends Amongst the Blooming Peonies

by Ling Huchu

*We had a drinking party to admire the peonies.
I drank cup after cup till I was drunk.
Then to my shame I heard the flowers whisper,
“What are we doing, blooming for these old alcoholics?”*

Matching Premier Linghu’s “Taking Leave of the Peonies”

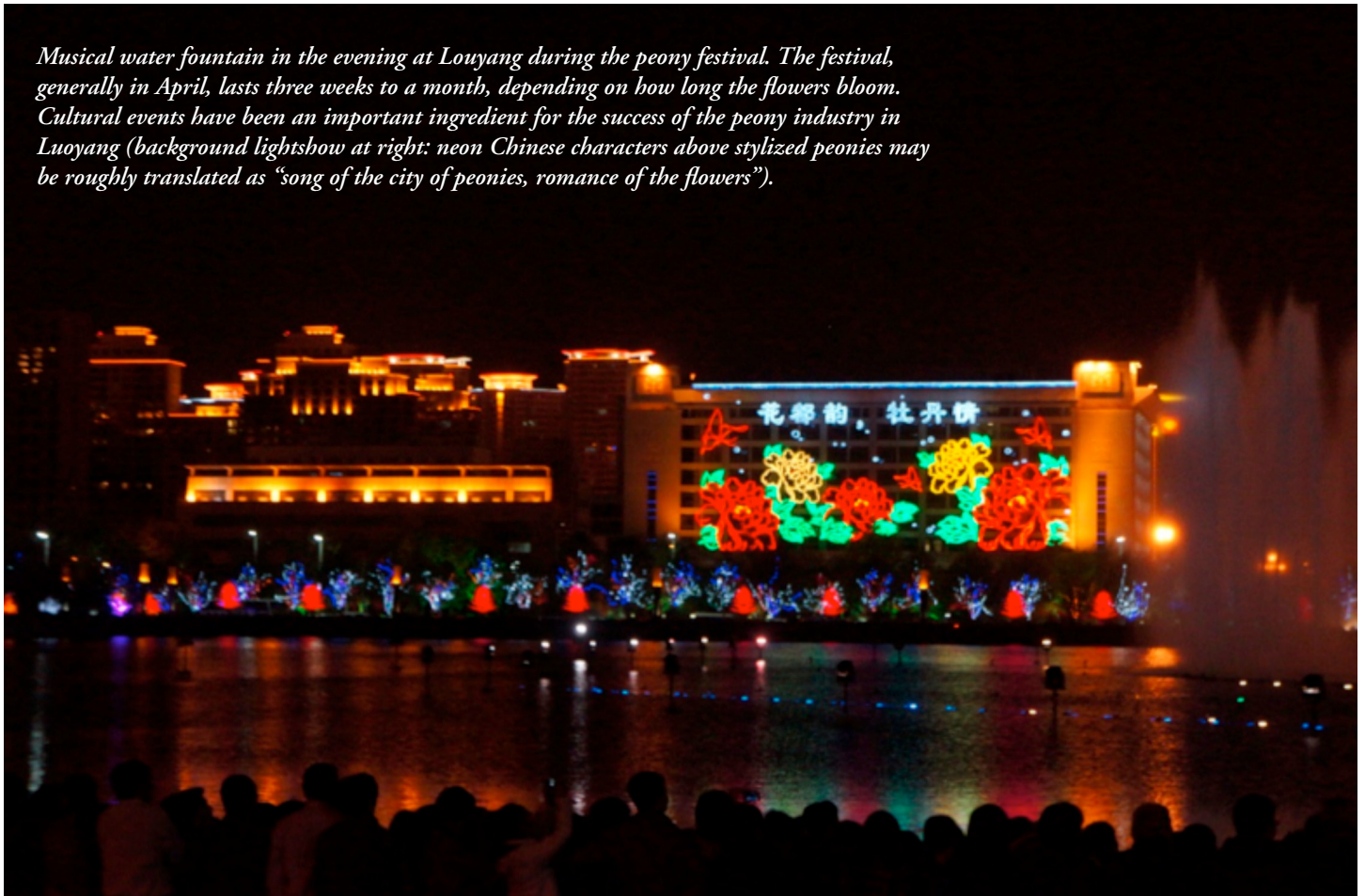
by Liu Yushi

*In my official mansion, a balustrade of flowers.
But when it’s time for them to bloom, I’m always away from home!
Do not say the Twin Capitals are not far distant parted.
The springtime brilliance beyond my gate is the very abyss of Heaven.*

During the Tang dynasty, there were twin capitals in China: one was the city of Xi’an (where in modern times the terracotta army of the ancient emperor Qin Shi was found); and the other was Luoyang, where the tree peony was and continues to be famous. In the modern day, on the streets as well as the buildings, one can easily see signs of the peony’s influence throughout the city: sculptures, friezes, gardens, artworks, building and business names with peonies. As such, visitors are immersed into the culture of peony flowers. In combination with the peony festival, there are musical water fountain shows and music shows.

The herbaceous peony has been loved in southern China since the Sui dynasty (589–618) as well as in the Tang dynasty, but their culture thrived in the Song Dynasty (960–1279) with the center in the City of Yangzhou. In ancient times, streets were named after the herbaceous peony and some still remain today (Xu, 2005). Even now, the herbaceous peony is one of the two city flowers for Yangzhou.

Musical water fountain in the evening at Louyang during the peony festival. The festival, generally in April, lasts three weeks to a month, depending on how long the flowers bloom. Cultural events have been an important ingredient for the success of the peony industry in Luoyang (background lightshow at right: neon Chinese characters above stylized peonies may be roughly translated as “song of the city of peonies, romance of the flowers”).



Peony tourism

The city of Luoyang now is the tree peony capital in China, and has the largest commercial tree peony garden in the country. Each year, these commercial gardens attract millions of tourists to the city, which contribute millions of dollars to the Luoyang economy. I visited one of the largest commercial gardens there and met the private owner of the garden, Mr. Fu Zhenling. He told me that only the day before, around 30 thousand visitors had entered the garden. I noticed the garden entrance fee was 50 Yuan (~\$8.00 USD). The total gross revenue for that day, I calculated, was around \$240 thousand USD. Of course, in Alaska, we are unlikely to expect similar amounts of visitors and income to a commercial peony garden if such a one existed. However, the message I received from this is that people love peony flowers in China. Because their peony flower season is so short—only from April to early May—this could be a potential market for Alaska growers.

Research pertinent to Alaska

While in Luoyang, I visited the Henan University of Science and Technology, College of Agriculture, and met their leading peony researcher, Professor Shi. While at the University of Yangzhou, College of Horticulture, which has

a research garden housing many herbaceous peony species, I met the dean and the department chair, who lead the peony research group there, and also listened to a presentation of their peony research. My general impression is that they have done a great job on peony research and generated a wealth of information on peony plants.

Here are two examples that can be used to demonstrate their advancement in understanding herbaceous peonies. First, they studied medicinal use of above-ground tissue for its isomeric pentacyclic triterpene oleanolic (OA) and ursolic acid (UA) concentration. These two acids have been proved to function as antioxidants, antibacterials, anti-inflammatories, and anti-tumor agents. They evaluated fourteen cultivars for their OA and UA concentration, and found some cultivars have higher concentration of these two acids as compared to others (Zhou et al., 2011). Second, they did research work on cut stems, and based on which they found CaCl_2 can be used to strengthen flower stems (Li et al., 2012). This information is useful for us in Alaska.

Besides visiting their research institutes and peony gardens, I also collected and read 40 journal papers from China on tree peonies. In a very brief summary, these papers cover areas of : 1) predicting blooming time based on air or soil temperature; 2) chemicals used to extend cut flower vase life, 3) literature review; 4) marketing research;

The author, Dr. Mingchu Zhang, left, with the commercial peony garden owner Mr. Fu Zhenling in Luoyang.



4 5) physiology study; 6) disease control; 7) tissue culture; 8) stem transplanting; and 9) taxonomy of flower types. Of these research papers, I found two areas particularly interesting to me and if they are successfully adapted in Alaska, there will be large economic benefits to Alaska growers. Specifically, these are tissue culture and stem direct transplanting. Even though the tissue culture is conducted for the tree peony, the results still can be adapted for herbaceous peony. The best culture medium is MS + 6-BA (0.5-1) + NAA (0.1 - 0.2). The suitable light intensity is 2,000 lux (10 h/day), and room temperature (25°C) is desirable. One paper dealt with stem direct transplanting. For 10 tested peony species, the survival rate varied from 53 to 93%. These are pretty high survival rates. This result shows that it is possible to plant peony stems rather than roots. The root growth promotion chemicals used are ABT-6 (Auxin Bequeathed with Third component), and indole-3-acidic acid. The survival rate from ABT-6 treated plant is higher than the ones treated by indole-3-acidic acid. I would certainly like to see this research conducted at our school. In fact, Dr. Patricia Holloway has a plan to try some of these methods for tissue culture using Alaska herbaceous peonies.

In summary, this trip, even though it was short, has helped me to understand more about peonies and peony research in China. More important, this trip allowed me to build relationships with researchers and peony gardeners in China. The information collected during my sabbatical will certainly bear fruit as we strengthen the leading role of our school in peony research in Alaska.

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Herbaceous peony variety trial in a Yangzhou University garden.



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