

Creative Northern Viticulture Transforms a Chinese Village

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The steppes of Inner Mongolia are about as inhospitable to agriculture as one can imagine. Just north of the Yellow River, midway between the cities of Hohhot and Baotou, is the village of Dong Yuan. Around Dong Yuan the average rainfall is only 13 inches. The water table is low, 10 meters (32 feet) below the surface. The only significant source of water much of the year is snowmelt from the surrounding mountains which is trapped in reservoirs and carefully doled out. The average annual high temperature is 38 °C (100°F). The average winter low is -26 °C (-15 °F) and can dip to -32 °C (-25 °F). Typically, there is no snow cover during the winter. The winter cold penetrates deep into the soil, causing root injury to many fruit crops. The best soil lies in the valley beneath the snowcapped mountains. But the valley takes a pounding from frost in spring and fall. The typical frost free growing season in the rural area around Dong Yuan is about 125 days. So, ironically, despite the blistering hot summer, the frost free season is about like Riga.

The village of Dong Yuan struggled for many years with apple production as a means of subsistence. Winter injury and low wholesale prices in Beijing for local apple varieties made subsistence difficult. Growers tried to grow grapes, but always suffered losses to root injury almost every season.

Today, Dong Yuan is a prosperous village. Cell phones, satellite TV dishes, and new cars are common. As I discovered during my visit last May, Dong Yuan owes its prosperity to grapegrowing. Their seedless table grapes fetch a wholesale price of US\$1.00 per pound from the Carrefour superstores in Beijing. What caused this transformation?

Professor Li Xue Wang at the Inner Mongolia University of Agriculture took it upon herself to understand why grapegrowing had failed in Dong Yuan and similar villages over the years. Her research concluded that root injury due to deep winter freezing of the soil was the problem that limited production. Prof. Wang pioneered a solution called *deep ditch cultivation*. The idea is straightforward. You plant the vines in the bottom of a trench nearly 5 feet deep. So, the roots start growing five feet deeper than they would if the vine were planted at surface level. As the vine grows, about a foot of soil is added to the trench each year until the soil in the trench is within about 16" of the surface. It is maintained at this level. Even in the coldest snowless winters, the main roots of the vine are deep enough to avoid the coldest soil temperatures and injury.

Varieties that also have tender trunks and canes are laid down in the upper portion of the trench before winter and protected with 16" of soil. Figures 1 and 2 below and the photographs in the companion file to this article illustrate this deep ditch cultivation technique.

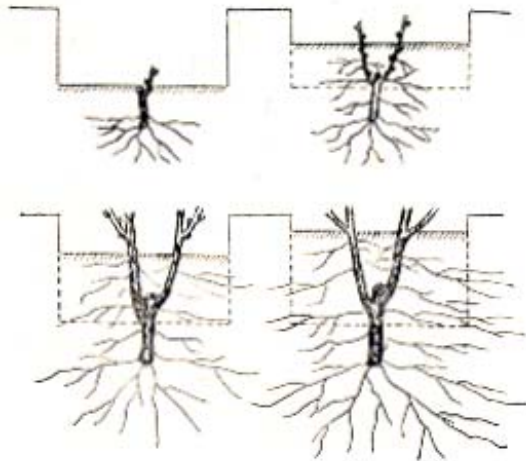


Figure 1. Deep ditch cultivation of vines. Development of root system in years one through four after planting (Wang, 1985).



Figure 2. Mature vines under deep ditch cultivation.

Premium vinifera varieties such as Red Globe Seedless fetch the highest prices in the Beijing marketplace and are being widely planted around Dong Yuan. Other table grape varieties include some seeded ones: Yellow Banana, a white vinifera x labrusca variety; Ju Feng, a blue tetraploid of Campbell x Rosaki; and Tuo Xian, a huge pink vinifera. All are characterized by large berries and large attractive clusters and by their ability to ripen within the 125 day frost free season of Dong Yuan. Vines are trained in a long vertical cordon positioned on a rather massive sloped trellis. Very short one or two bud spurs are pruned along the cordon for fruiting.

The grape industry in Inner Mongolia has grown to 8000 acres of vines. Production still is mostly of table grapes for the huge market in Beijing. But several wineries also have started recently, including the 50,000 gallon capacity Viction Winery near Dong Yuan. The idea of processing grapes to add value is a new one around Dong Yuan, but is catching on. Prof. Wang teaches her students that economics must go hand in hand with horticulture. "It is not sufficient to know how to grow a fruit crop," she tells them. "You must also understand what to do with it to maximize its economic value." Very "new China" indeed!

Growers around Dong Yuan believe that they have solved the problem of winter injury to the vine's roots. But that is not quite enough. All of their premium grape

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varieties also have tender trunks, canes and buds, and require protection with soil to survive the winters. They would love to have varieties that do not require this kind of protection. In the long term, breeding will provide the solution for this. This year we started some collaboration, pollinating some super hardy Swenson table grape selections here in Hugo with pollen from the Inner Mongolian varieties Ju Feng and Yellow Banana. Who knows what we might get? Hopefully a hardier premium buck-a-pound table grape.