Propagating the Hardy Kiwis

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INTRODUCTION

All of us are familiar with the brown fuzzy kiwis that the New Zealanders did such a wonderful job marketing to North Americans. It has become a staple fruit that is now raised in warmer regions throughout the world. Not as many, however, are aware that there are many species of kiwi (genus *Actinidia*) and that some of these kiwis are extremely hardy.

We first became aware of the hardy species in the early 1980s. We were actively seeking fruits that could survive winter temperatures of -35 to -40°C (-40°F) and that could ripen their fruit in a growing period that averages only slightly more than 100 frost-free days. The two species that interested us most were *A. arguta,* commonly called the hardy kiwi, and *A. kolomikta*, the arctic kiwi. These species are native to northeastern Asia in the region between northern China and the Sakhalin peninsula of Russia. The weather conditions of this area are very similar to our own in the maritime provinces of eastern Canada.

We were able to access some very interesting cultivars of *A. kolomikta* that had been developed out of breeding research in Russia. These cultivars were chosen for productivity, hardiness, fruit size, and quality. Some of the cultivars we planted included 'Krupnopladnaya', 'Pozdanaya', 'Nahodka', 'Aromatnaya', 'Matovaya', and 'Sentyabraskaya'. We also planted the cultivar 'Arnold Arboretum' from the Arnold Arboretum in Jamaica Plains, Massachusetts. Because this species is dioecious (needing both male and female plants to set fruit) we also planted a selected male clone for pollination.

This species has thrived at our location since we first put in our mother plants. Life has not always been easy for them. They are planted in full sun, facing south on a slight slope that is open to strong winds from nearly every direction. It is a good site for testing hardiness. They have endured temperatures of -40°C and little or no snow cover with no appreciable winterkill. Our later plantings were placed in locations more amenable to survival. We have chosen sites that are partially shaded so that the ground is cooler and moister, conditions more like the understory conditions in their native habitats. Once they climb into sunlight, they fruit heavily. We usually expect fruiting from new plants within 2 to 3 years. Once in a fruiting state, they produce annually and heavily every year. The new leaves in spring are frost tender, so siting is important. Once they climb up the supports provided, they are less likely to suffer severe frost damage because their leaves are high enough to escape the coldest temperatures, which are usually at ground level.

We originally planted six cultivars of the second species, *A. arguta*. Here the survival rate was not quite as good. The first winter we lost a numbered cultivar developed at the University of Michigan and a selection from the Research Station at Geneva, New York. We also lost the well known cultivar 'Ananasnaya', believed to be a cross between *A. arguta* and *A. kolomikta*. The survivors, which have thrived

since planting, include 'Dumbarton Oaks', which had been growing at the Dumbarton Oaks garden near Washington D.C., 'Meader #1', developed by Dr. Meader of New Hampshire, and a male variety of unknown origin.

This species is more vigorous than *A. kolomikta* and has a glossy green leaf that is quite different from the matte green leaves of *A. kolomikta.* In other respects they behave similarly. This species takes 5 to 6 years to begin producing fruit. The cultivars we have kept have survived the same winter conditions as mentioned above.

These two species are important new introductions to northern horticulture. Not only is their fruit delicious but the twining vines are stunning plants. *Actinidia arguta* has clean glossy foliage that stays in excellent condition until it is killed by hard frosts in the fall. The foliage of *A. kolomikta* is fascinating because of the variegation that occurs during and after flowering. The male plants and many of the females become variegated with patches of white and pink appearing throughout the plant, hence one of its common names, the tri-color kiwi. These vines are extremely vigorous and there are now vines growing near us that have reached the top of a three story building.

The fruits of both species are outstanding. The flavor is very like the fuzzy kiwi (*A. deliciosa)* and is perhaps even sweeter. Many have said they prefer the flavor of the hardy kiwis. The fruit is generally about 25 mm (1 inch) in length and 12 to 15mm (½ to ⅝ inch) in width. They are grass-green and hairless. You pop them in your mouth like a grape. Mature vines can easily produce several kilos of fruit.

MATERIALS AND METHODS

We propagate both species of hardy kiwi using the same methods. In early spring we harvest hardwood cuttings from vigorous 1-year growth. We use 1 to 2 nodes per cutting and dip the base of the cutting in a #3 Seradix rooting hormone. Care must be taken that proper polarity is maintained as the polarity of nodes without leaves is not always apparent to the untrained eye. We use a rooting medium of perlite and screened peat (4 : 1, v/v). Nutricote 14N-14P-14K 100-day slow-release fertilizer is also incorporated at the rate of 0.5 litres yd^{-3} medium. These are placed in flats of 32-vinyl pots (2¼ inch × 2¼ inch × 4 inch). The flats are watered in well and then placed in a house humidified by a Mee high pressure fog unit. Bottom heat of 25°C is maintained until callousing, then lowered to 20°C until they are removed from the house. Rooting generally occurs in 14 to 16 days. The trays are removed when two out of three pots show roots coming through the drainage holes. The rooted cuttings are hardened off for 1 week and then potted into 1-gal pots complete with a stake. By early summer the plants are salable.

The second method of propagation uses softwood cuttings, preferably taken in early summer when the wood is slightly stiffened, although we have taken cuttings as late in the season as July with good results. Summer cuttings are rooted on the floor of the house with no bottom heat and are given a #1 Seradix hormone treatment, but are otherwise treated in exactly the same manner as the hardwood cuttings.

RESULTS

We have had excellent success with the hardy kiwis. Softwood cuttings have provided the best results with most crops rooting nearly 100%. Hardwood cuttings and softwood cutting crops taken late in the season will not be quite as successful,

but we expect at least 80% take or better. It should be noted, however, that a rooting medium with low porosity or overly wet conditions in the house can cause rotting. This may account for some reports I have read complaining of poor success in rooting these species.

DISCUSSION

Although the hardy kiwis have been growing in North America for nearly a century, there are still only a limited number of nurseries growing the improved cultivars. Those nurserymen growing in the colder regions should consider this crop. The market for these vines is potentially immense. The exotic nature of the plants fascinates a public jaded by "the commonplace" in horticulture. Once we have convinced our customers that these kiwi are truly hardy, we have not had any problems selling the plants. Our biggest challenge has been to hold onto the vines long enough to get them to size. The desirability of the hardy kiwi vines, combined with their relative ease of propagation, presents an ideal opportunity to provide a fascinating new group of plants to the public.

Light Light Light

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INTRODUCTION

This presentation is a review of a novel and effective way to provide light to plants to facilitate optimum growth and quality, while trying to reduce operating costs.

Quality plant growth requires water, nutrients, media, proper temperatures, an environment free from pests and pathogens, and light in proper quantity and of sufficient quality. Light is the energy source essential for survival and proper growth. Typically on the 21st day of June the maximum light in terms of quality, quantity, and duration is available via the sun alone. On the 21st day of December there just is not enough light to achieve the same result. Also, proper light enables maximum quality potential barring other limiting factors.

I have observed and participated in efforts where plant quality has been compromised due to insufficient light. Because of this, I have sought to find methods to improve lighting systems but remain cost effective.

In addition to the direct experiences I have acquired lots of antidotal evidence of the value of things, like moving shade houses, which have yielded crops of unsurpassed quality. The wave concept has the analogy of a sunny day with cumulus clouds intermittently providing a cooling shade as they drift over the crops.

METHODS

Experiments were conducted during the growing period of 15 Oct. 1998 through 15 March 1999. The greenhouse was maintained at a daytime temperature of 78°F, and a night time temperature of 68°F. Photoperiod was 16 h light and 8 h dark. Lights were on from 5 AM through 9 PM.