

Principal Investigators

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Project Duration

2008 to 2009

Award Amount

\$17,487.00

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goji berry,
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Growing the Goji Berry in Minnesota

Project Summary

In 2008, we started a goji berry patch on our farm in east-central Minnesota to determine if gojis can be a viable crop in Minnesota. We started all the plants from seed in the greenhouse then transplanted the vines. Although they grew rapidly and set fruit the first year, the seedlings showed too much variability in plant height and fruit quality. Most of the plants came through the cold winter of 2008-2009 with little or no winter injury. During the summer of 2009 the plantings were hit with a leaf disease, which destroyed the crop.

Project Description

Goji berries (*Lycium barbarum* L.) are a small fruit native to the mountainous regions of western China to Mongolia. Other names for goji berries include wolfberries, lycium berries, and matrimony vine. Goji plants are perennial vines, similar to climbing nightshade or woody nightshade. Goji plants produce red, oblong fruit with a unique, sweet flavor.

Worldwide, most goji berries are grown in the mountainous areas of northwestern China, where annual production exceeds 5 million kg/year. In the U.S., there are small fields in Utah and Iowa, but this crop has not been tested in Minnesota. Currently there is little reliable information on varieties, yields, or climate requirements for growing goji berries in the U.S. Ningxia, an autonomous province of China,

is the leading producer of goji berries and has a continental climate with midwinter temperatures that often fall below -25°F.

In order for a new crop to be commercially viable, it must have the following characteristics:

1. The plant must be hardy enough to survive zone 4 winters.
2. The fruit must be able to mature in our relatively short summers.
3. The plant must be resistant to common diseases.
4. The fruit must be good enough quality to attract new customers.
5. Yields must be high enough to be economically viable.

We bought goji seed from Fountain of Youth Goji Vineyard in Winterset, IA and from Timpanogos Nursery in Utah and planted the seeds in the greenhouse in early April, 2008. The vines grew rapidly in the greenhouse, reaching lengths of 1' or more within a month. We transplanted 600 seedlings on May 31, 2008 on a 4' by 6' spacing. Our farm near Harris, MN has a loamy sand soil. The plants were enclosed by a 4' high fence with chicken wire to keep rabbits and other pests away from the goji plants. Weeds were controlled by hoeing and all watering was done by hand. In the middle of summer, we tied all the plants to wooden stakes. In the fall, we mulched the plants with woodchips.

Goji flower and green fruit.



Results

The plants grew extremely well the first year, and some vines had over 7' of growth by the end of the first growing season. The fence proved to be critical because we placed a few plants outside the fence, and all the plants outside the fence were eaten by rabbits.

The winter of 2008-2009 was a test winter for many perennial plants. The temperature dropped to -27°F twice during the month of January. The goji plants came through a zone 4 winter with very little winter injury. The tips of the branches died on most plants, which is similar to grape vines or some raspberries. About one-fourth of the plants had severe winter injury and died either to snow level or died completely, but on most plants the only injury was the tips dying back a few inches.

In early June, many goji plants were healthy and growing rapidly, but in July, the plants were hit hard with a leaf blight. According to the University of Minnesota Plant Disease Clinic, the disease was caused by *Alternaria* fungi, which means that the disease probably was the same as early blight in tomatoes. Goji berries are closely related to tomatoes and peppers, and the disease could have spread from the tomatoes to the goji plants. Most goji plants were partially defoliated by the leaf blight, but a few seedlings showed some resistance. By early fall, many plants started to recover.

The leaf blight destroyed the fruit crop for this year. By September, the plants that recovered from the blight formed new leaves, but it was too late for the plants to start forming flower buds and ripening fruit. A few plants were setting fruit as the first hard frosts were starting in late September.

Most woody plants initiate flower buds from the middle of summer through late fall, and the buds stay dormant until the following spring when the plant blooms over a short period. By contrast, gojis appear to set fruit on new growth. The plant blooms throughout late summer, and fruit ripens over a long period, similar to an indeterminate tomato plant or a day neutral strawberry. From our experience, it appears that flower bud formation occurs when the plants are forming new leaves, with the flower buds emerging from the nodes just below the leaf. After forming fruit, the plant often forms a sharp spine. At no one time do gojis produce a large quantity of fruit, but they could have high yields if they bloomed and ripened fruit over a 2 month period. If goji plants are going to produce enough fruit to become commercially viable, we will have to find varieties that bloom from early summer so that berries can be picked over a 2 month period. Most likely, the low yields in 2009 were caused by the stunting resulting from loss of leaves from blight.

The fruit quality varied considerably among the seedlings. A few seedlings had small, yellow fruit that was bitter. Other plants had fruit that was nearly .75" long, with a deep orange color and excellent flavor.

The extreme genetic diversity of our seedlings kept our goji planting from being commercially viable. About half of the seedlings were inadequate either from winter injury or slow growth, which meant that only half the plants were vigorous enough to produce a crop before the summer leaf blight. Among the plants that produced fruit, many had fruit that was too small or too bitter to be sold. Only about one-fourth of all of the plants had growth rates and fruit set that were high enough to be commercially viable.

Management Tips

1. Goji berries are susceptible to the same leaf diseases as tomatoes, and those diseases can easily destroy the crop. Diseases should be controlled with either fungicides or resistant varieties.
2. Although goji berries are easy to start by seed, an orchard of goji plants started from seed is not commercially viable. Goji seedlings showed far too much variability in growth rates, winter injury, and fruit quality, and the planting was not nearly uniform enough.
3. In order for goji berries to become economically viable, we must find varieties suited for the Minnesota climate.

Project Cooperator

Thaddeus McCamant, Northland Community and Technical College, Detroit Lakes, MN

Project Location

We are 2 miles north of Harris, MN on Forest Blvd. (Hwy. 30). Take a right turn on 465th St. and we are the last house at the end of the street on the left hand side.

Other Resources

Dharmananda, Subhuti. *Lycium Fruit: Food and Medicine*. 2007. Website: www.itmonline.org/arts/lycium.htm

Fountain of Youth Goji Vineyard, Winterset, Iowa.
Website: www.fountainofyouth-gojiseed.com

Timpanogos Nursery specializes in goji berry production and is located in the Rocky Mountains of Utah. Website: www.timpanogosnursery.com