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A New Chestnut Cultivar "Huaqiao 2"

Yingqiu Tian

Xiangtan Research Institute of Forestry Sciences, Xiangtan, China
Email: tianyingqiu1970@163.com

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Abstract

This paper introduces new chestnut cultivar "Huaqiao 2" breeding process, main characteristics, seedling and planting technique, harvesting and handling chestnuts, chestnut food, industrial development, Xiangtan Jinhu Chestnut Professional Cooperative etc., provide a theoretical basis for research and industrial development of new chestnut cultivar "Huaqiao 2".

Subject Areas

Plant Science

Keywords

A New Chestnut Cultivar, Seedling and Planting Technique, Chestnut Food, Industrial Development

1. Introduction

Huaqiao chestnut originated in Xiangtan county, which is a seed breeding community. It is famous in Xiangtan city and in Hunan province; it is the main local specialty in Hunan province [1].

2. Breeding Process

Huaqiao chestnut breeding and cultivation technology research team was established in xiangtan research institute of forestry sciences in 1996. From 1996 to 2016, carry out primaries, check, runoff of the Huaqiao chestnut varieties. "Huaqiao 2" chestnut was succeeded in the examination by hunan province forestry good varieties organization committee in 2007, number: hunan S0730-cm9. "Huaqiao 2" chestnut was approved by the State Forestry Bureau in 2012, number: 20120132 (**Figure 1**). The two local standards of Huaqiao chestnut are established [2].

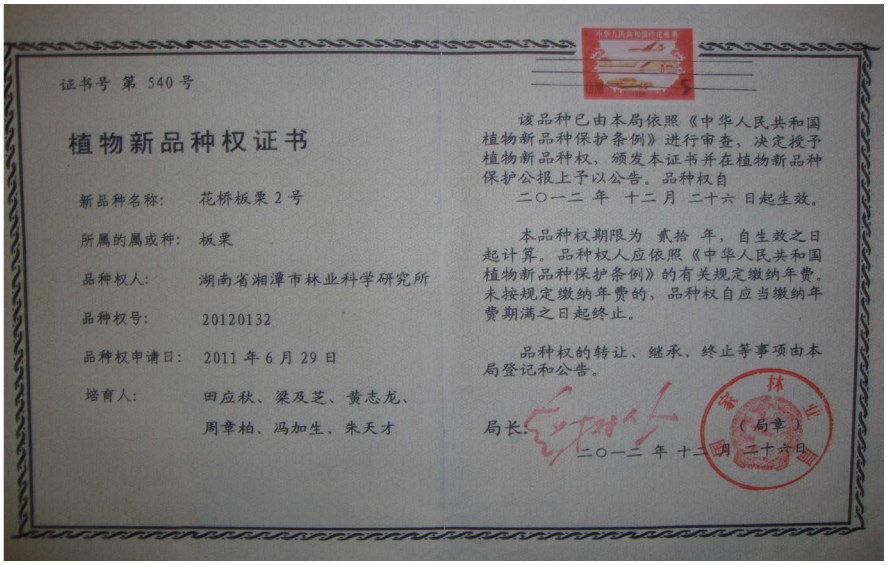

Figure 1. Certificate of plant new variety rights.

3. Main Characteristics

"Huaqiao 2" is a new chestnut (Castanea mollissima) cultivar developed from chestnut seeding tree by Xiangtan Research Institute of Forestry Sciences, The parents need to be further investigated. Origin: south of China-Hunan province. Chestnut blight susceptible: no. Tree growth habit: very fast growing with medium height. Bloom time: early season. Harvest: early season. Nuts per burr: usually 3 (**Figure 2**). The average nut weight is 16.2 g, it is a large oval nut, red brown, shiny, easy to peel. Nut kernel rate is 81.8%. Fruit ripe period is from the end of August to the first 10 days of September [3]. The yield is 6900 kg·hm^{-2} (yield of test tree), with high and stable yield, and suitable for planting in the neutral to acidic gravel soil. Nutrients of "huaqiao 2": 29.0% of starch, 6.91% of total sugar, 6.48% of crude protein, 3.5% of crude fat, 50.0% of water . The data are based on wet basis. The data are provided by the center for food testing and analysis of the agricultural products processing research institute of Hunan province [4]. The main characteristics of the fruit are early maturity, large nut and high yield.

4. Seedling Technique

Nursery land should be close to the afforestation area center and convenient transportation. The soil depth is not less than 30 cm, the pH value is (5.5 - 6.5). The soil is rich fertile, and has no insect pest. The rootstock should use fully mature, uniform size, no plant diseases and insect pests, late mature local chestnut seeds, 7.4 g per nut is appropriate [5]. The best way to purchase chestnuts for seed is directly from a chestnut grower. The nuts will not be any cheaper but they will be fresh and unprocessed. Be sure to purchase twice the amount of chestnuts you think you will need. This is to compensate for the low germination rates of chestnuts. Getting the chestnut to start germinating—extending the tap

Figure 2. Nut of new chestnut cultivar "Huaqiao 2".

root out of the nut. Placing the germinating chestnut seed in soil where the seed will complete the germinating and put up top growth of the new tree. When direct seeding chestnuts, remove about 1 to 2 inches of soil where you want to plant the seeds. In addition, the seeds can be covered with peat moss to keep the chestnuts moist. Once the seed have been placed, put the removed soil back on top of the chestnut seeds. Do not let the soil dry out. If the seeds are in dry soil the seeds will also dry out killing them. Keep the seed bed weed free at all times. It will take 3 to 6 weeks for the seeds to complete the germinating process and start emerging. When the seedling is big enough, the seedling may be grafted. Mid September the seedling will be grafted with scion wood from Huaqiao 2 chestnut cultivar [6]. The effect of the newly unearthed rootstock seedling transplanting is poor and can not be used [7]. Fall and Spring grafting require that the rootstock diameter is in 0.5 cm above. Survival rate of Autumn grafting is better than that of the Spring grafting [8]. Grafting in spring and grafting in autumn had no effect on the growth of grafted seedlings [9].

5. Planting Technique

Your first step, even before planting your first tree, is find a chestnut tree cultivar that delivers chestnuts to fulfill your needs and the needs of your customers. Selecting your primary chestnut producing tree is the one thing has the greatest impact on your success of your efforts.

Chestnut orchard must prevent human and animal damage. Chestnut trees will not grow in heavy or clay soils. The clay soils are difficult for the chestnut tree's roots to penatrate. Too much soil water, chestnut trees can not grow, or even die. Finding the right location for planting chestnuts consists of finding sunlight and well drained soil. Chestnut trees will grow in partial shade but they grow slow and will not produce lots of chestnuts. When transplanting dig the hole about twice the size of the container the seedling is being removed from. This gives space around the seedling with soft soil to extend its roots into. Be careful of damaging the roots and keep as much soil as you can with the seedling. Fill the hole around the seedling. The newly transplanted seedling has to be

watered right away. This causes the soil to settle around the roots. This is a very important step and can not be left even if it is raining. If the soil is already water saturated then the seedling will die in a few days. A better choice would be to plant the chestnut seedling in well drained moist soil.

Chinese chestnut seedlings are widely available in nurseries. Although these trees provide adequate nut production for home use, seedlings often produce small nuts of mediocre quality. Establishing an orchard of chestnuts with seedling trees will make nut harvest overly complicated. Each tree in the orchard will ripen at a different time making quick and efficient harvest difficult. Grafted trees of proven cultivars provide more uniform ripening, higher nut quality, larger nut size, and more consistent yields. Chinese chestnuts can be established by planting grafted trees, by planting seedling trees then field grafting one to two years later, or by planting nuts then field grafting two to three years later. Each of these methods has advantages and disadvantages. Most commercial chestnuts are produced on grafted trees using known good parents of named cultivars.

Chestnut trees for sale directly from the grower, it takes from 2 to 3 years for a chestnut tree to start producing chestnuts. It is not easy propagating chestnut trees. Once a new chestnut tree finishes its first growing season, it is easy to take care of. Chestnut trees are drought tollerent and grow to be a beautiful shade tree that also produces a great tasting nut falling to the ground in the fall. The bad thing is the cold can damage or even kill the trees, but there is no freezing damage in the southern part of China. One of the most devastating sicknesses for a chestnut tree is phytophthora. In a single growing season, a health chestnut tree can contract phytophthora, slide into poor health and die, but Huaqiao 2 chestnut has a strong resistance to this disease. After the harvest is complete, collect all extra burrs, nuts, and leaf debris and destroy by burning and burying if possible.

6. Harvesting and Handling Chestnuts

Freshly fallen chestnuts are about 50% of water. Rotting comes in the form of spoilage from molds, yeasts, and fungus as well as freezing and thawing. Do not let fresh chestnuts freeze and thaw. Never store chestnuts in a sealed plastic bag (except dried or frozen). If black molds have entered into the chestnut kernel, do not eat the chestnut. Cooked chestnuts must also be refrigerated if not consumed right away. Try to purchase fresh chestnuts close to the time you want to eat them. Never take burrs from the chestnut trees. Taking the burrs can cause damage to the chestnut tree by breaking branches. Also, the burrs on the tree contain nuts that are not mature. Closed green burrs that fall to the ground should be left in place. In a few days the burr will open and the chestnuts can be collected. If you do not wait until the burrs open and the nuts are easily removed, you will end up with a lot of "white" chestnuts. White chestnuts have no commercial value and will never get to the "taste good" condition a normal ripe chestnut will achieve. Chestnuts must be refrigerated to keep from going bad if

the chestnuts are not planned to be used. Chestnuts have to be stored in open sacks so they don't go bad. Because "Huaqiao 2" chestnut is a precocious variety of Chinese chestnut, and the temperature is high when the fruit is ripe, so the nut is not stored at room temperature, chestnuts will grow molds in just a few days if left out in open air. Always store unused chestnuts in the refrigerator [10].

7. Chestnut Food

Enjoying fresh chestnuts in your diet is a great choice. Chestnuts are low in fat, gluten free, high in fiber, and they taste great. It is hard to find a better tasting food item than fresh chestnuts. The chestnut is a highly nutritious food. Unlike most nuts, which are high in fat, chestnuts have only a trace of fat and one-third the calories of other nuts, such as peanuts or cashews. Chestnuts are also the only nut with a significant amount of vitamin C and no cholesterol. The protein of chestnuts is of excellent quality and comparable in amino-acid content to that of an egg. Chestnuts are considered "a grain that grows on a tree," being similar nutritionally to brown rice. Chestnuts are also a very versatile ingredient for many types of dishes aside from just eating it fresh from the roaster. From soups to salads, main dishes, chestnuts can be a part of each and every one. Chestnuts may be dried and made into pasta or sweet flour for pastries and breads. This diversity of uses and high nutritional quality from a perennial tree crop have made the chestnut a popular food source, including throughout history and in many different cultures around the world. Specialty chestnut products are becoming more commonly available in China markets and through Internet sales.

8. Industrial Development

The development of Chinese chestnut industry in Hunan province of China is slow, mainly from the import of chestnut in other provinces, so the development of Chinese chestnut industry in Hunan province has a good market prospect. Two huaqiao chestnut professional cooperatives are founded. A "Huaqiao 2" chestnut seedling base is founded. A "Huaqiao 2" chestnut cutting orchard is founded. Growers with large, high-quality chestnuts can compete favorably with imported chestnut crops because growers in Hunan province of China can reach the Hunan province market earlier and deliver a fresher product and sell at a premium price. Internet sales can also be a successful method to sell chestnuts and chestnut products.

9. Xiangtan Jinhu Chestnut Professional Cooperative

Xiangtan Jinhu Chestnut Professional Cooperative was formed to provide commercial and retail clients with premium Huaqiao 2 chestnuts and Huaqiao 2 chestnut trees in china. Orders can be shipped to anywhere in china. Using best practices methods to manage the orchard and the delivery of the fresh chestnuts and chestnut nursery stock. Propagating chestnut trees for producing fresh

chestnuts has become one of professional cooperative core competencies. Fresh chestnuts for eating and chestnut trees both grafted and seedlings, form core products. During the months of September, October, and November, having fresh chestnuts for sale. From September through mid March having bare root chestnut trees for sale. Starting in September and continuing until the end of February and having chestnut scion for sale. From initial graft to producing the first chestnuts takes 3 - 4 years. Full production is 30 - 50 years depending on growing conditions. Having been propagating chestnut trees since 2011. Chestnut trees are easy to grow and require almost no maintenance.

10. Conclusion

A new variety is an industry, which is rich in the resources of chestnut varieties, and is a good breeding material. Planting chestnut tree is conducive to our environment and our society. We should strengthen the research of varieties, high yield technology, storage and processing.

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