Design and Experimental Study on Tissue Culture and Rapid Propagation Model of Qionghua in Tianmu Based on Modern Biotechnology

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Abstract: From 2017 to 2018, the cuttings of Qionghua in Tianmu were treated with the mixture of peat soil, perlite and sand, and the cuttings were treated with the growth hormone ABT1 rooting powder to a concentration of 1500ppm, the treatment time was 15s, and the survival rate was more than 85%. The results showed that the cutting propagation of Qionghua in Tianmu speeded up the seedling raising process and played a positive role in promoting the development of the variety diversity of seedlings in this area.

1. Introduction

In recent years, with the increasing demand of variety diversity of landscape, the Qionghua of Tianmu has been widely promoted. Our company introduced it in 2014. After several years of cultivation and management, we found that Tianmu Qionghua has beautiful tree shape, beautiful leaves and very vigorous growth[1]. The flowering period is from May to June, when the flowers are in full bloom, it is like snow. The fruit period is from August to September, when the fruits are red in winter, the ornamental value is very high, and the demand for seedlings is also increasing. In order to speed up the propagation of Qionghua in Tianmu, we have adopted the method of Cuttage Propagation and achieved good results, which are summarized as follows. As shown in Figure 1

Figure 1 Qionghua species of Tianmu

2. Summary of Qionghua in Tianmu

Safflower family, Viburnum Linn., shrub, 2 ~ 3M high, is a umbel shaped inflorescence terminal. The shape of the tree, the color of the leaves, the posture of the flowers and the fruits are all very beautiful. In summer, there are few fruits, diseases and pests. That's a good Bush variety for garden greening[2].

The height of deciduous shrub is 1.5-4m. Gray, thick bark and slightly stiff crown. Blanche,

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AOL and fiddis are all graphic models. Under the leaves, only a group of armpits collect hair, or sometimes there are several hairs in the veins. The outline of the leaf is round ovate, wide ovate or ovate, 6-12cm long, usually 3-lobed, 3 veins, 3 veins, round, truncated or shallowly cardioid, with rough edge and slightly outward expansion of the outer leaf. There are more than 2 ~ 4 long disc shaped glands and 2 diamond shaped basal stipes. The diameter of polycymbal shaped inflorescence is 5-10cm, most of which are surrounded by large sterile flowers. The cone is inverted cone, the Corolla is white, radial, almost round, about 1mm long[3]. Stigma 2 - lobed; sterile flowers have a diameter of 1.3-2.5cm, long stems, wide and oval robes, round tips, and inequality. The fruit is red, approximately round, 8-10 mm in diameter, flat in core, 7-9 mm in diameter, white, slightly thick, without longitudinal groove. May to June flowering, fruit September to October mature.

Tianmu Qionghua is geographically distributed in Jilin, Liaoning, North Hebei, Shanxi, South Shaanxi, South Gansu, West Henan, Gansu, South and West fog, northwest region, jianglongshan, count and count. Japan, North Korea and Russia are also distributed in Southeast Siberia. It was born in the sparse woods and bushes beside the valley with an altitude of 1000-1650 meters.

There are many branches and leaves, green leaves and gorgeous atmosphere in the application value of Qionghua. It's an excellent garden tree. Branches can be used to treat arthritis, low back pain, foot pain, and injuries; leaves can be used externally to treat pruritus, psoriasis, and pruritus. Fruit can relieve coughing, often used in acute and chronic bronchitis and coughing. Relevant information shows that the branches and leaves of Salvia miltiorrhiza have the effect of contracting uterus and treating uterine bleeding, while the fruit dew has diuretic effect[4].

3. General Situation of Nursery Land

The cutting breeding base is in the greenhouse of our scientific research base. Greenhouse area 250m2 (specification 25m * 10m), indoor cutting pool and automatic spray equipment, water control device, spray system and water purification treatment equipment. Each cutting pool is constructed with a width of 2m, a length of 20m and a side wall height of 40cm. A small hole shall be left at the bottom of 30cm of red brick laid on the side wall of cutting pool every 25cm horizontally to facilitate the outward seepage of substrate. The width of operation channel on both sides of the seedbed is 40cm. A 20 cm ditch is dug around for drainage[5]. A spray head shall be installed every 50cm of the seedbed. The spray range of the spray nozzle is 60cm, and the spray range of two branch pipes can completely cover the pool surface. The pool is filled with a substrate with a thickness of 30cm. The substrate is a mixture of peat soil, perlite and sand. 7 days before cutting, level the seedbed, sprinkle 3% ferrous sulfate solution 1kg/㎡, turn it into peat soil and perlite, and use two broad-spectrum fungicides (Carbendazim, Mancozeb, Chlorothalonil and Tolbutine methyl) 1000 times after leveling. Spray them independently and alternately. Pay attention to the thorough and comprehensive spraying, To be used by cutting.

4. Cuttage Breeding

The cutting time is in the first ten days of August, and the cutting time is completed before 7 o'clock every morning. The materials are collected from the cutting nursery of the unit nursery base. Select the healthy, well-organized, uniform, disease-free and half lignified branches of the year with a length of no less than 20cm, spray evenly 50% carbendazim 1000 times solution on the ear branches for disinfection, wrap them with wet cloth, put them into the moisturizing plate, and transport them to the ear processing site quickly. Before making cuttings, 75% alcohol was sprayed on all the articles for disinfection. In the process of ear making, the ear strips should be sprayed with water at any time. Scissors and hands should be sterilized with 75% alcohol from time to time. In the process of ear making, the young top of the ear should be removed first, and the ear should be cut into several cuttings of certain specifications according to the length of the collected branches and the density of the internode. The ear length is 8-10cm, and the upper cut is 1.0cm away from the petiole to ensure that there are 2-3 complete leaves. When the lower leaves are removed and the leaf amount is still relatively large, cut 1 / 2 or 1 / 3. The upper section should be cut into a circle

perpendicular to the radial axis to reduce the area of the section wound and the evaporation of water in the cuttings. The lower cut is cut into horseshoe shape to increase the area of root healing and facilitate cutting into soil. The scissors for cutting the cuttings shall be sharp and the cutting edge shall be flat and smooth. Before cutting, the lower end of the cuttings shall be tidied and tied every 50 bundles, and the cutting mouth shall be sprayed with 50% carbendazim 1000 times solution for sterilization and then dried[7]. After drying, the cuttings were treated with growth hormone ABT1 rooting powder. The rooting powder was dissolved with 95% alcohol and treated with 50% alcohol to a concentration of 1500ppm. The treatment time was 15s. After the cuttings are processed, they are immediately put into the turnover box vertically and transferred to the cutting pool for cutting. Cuttings were carried out in 17:00-19:30, and spray was stopped when cutting. The cuttage density was 400 plants / m2, and the depth of cuttings inserted into the substrate was 2 / 3-3 / 4 of the length of cuttings[9].

5. Post Cutting Management

When the fertilizer water management is inserted, the water is sprayed immediately to consolidate the substrate, then the automatic spray control valve is adjusted, and the spray is fixed for a time to maintain a water film on the leaf surface. After the callus formation, the new buds gradually spread out and applied 0.05% urea for foliar topdressing; depending on the growth situation, the new buds grew vigorously and gradually increased the amount of fertilizer, which was sprayed with 0.15% urea and 0.1% potassium dihydrogen phosphate, about once every 10 days. Foliar topdressing was stopped after spraying the same day[10].

Temperature control because the cutting time is summer and the temperature in the greenhouse is too high, 50% sunshade net shall be set up above the greenhouse to cover the shade, and ventilation and air exchange shall be carried out for the air vents on both sides of the greenhouse according to the dry humidity; sunshade net may not be covered from 18:00 to 8-9:00 of the next day in cloudy and sunny days to increase the light. The low temperature in autumn and winter is also harmful to cutting seedlings. In winter, remove the sunshade net above the greenhouse. If the temperature in the greenhouse is lower than 0 ℃, set up single arch shed and small arch shed according to the width of the seedling bed, so as to improve the small environment temperature of cutting seedlings and shorten the dormancy period in winter.

At the end of cuttage, spraying 50% carbendazim 800 times liquid and methyl tozin, spraying 7 times every 7 days, spraying at the end of the spray, keeping the medium dry and wet, and increasing the amount of fertilizer and water. The amount of nitrogen fertilizer increased to 0.2% before the root system was formed to transplant. In the middle of April, a 50% sunshade net was built above the greenhouse, gradually lifting the plastic film on the north and south sides of the greenhouse. At the end of April, stop supplying water to the cuttings, check that the cuttings are vigorous in growth, strong in leaves, thick in roots, with an average root length of about 10cm, and the survival rate of cuttings is more than 85%. It can be seen from the experiment of Cuttage Propagation of Qionghua in Tianmu that the survival rate of Cuttage Propagation is high, the management is simple and the cost of seedling cultivation is low in the modern biotechnology area. Large area cutting breeding can speed up the seedling raising process of Qionghua, and play a positive role in promoting the development of the variety diversity of seedlings in this area.

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