

Study on Walnut production Technology based on Safety production

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Abstract: with the continuous development of the walnut industry in China, walnut has become the largest dried fruit tree species in China. 28 provinces and autonomous regions in China have different areas of cultivation. Due to the rapid expansion of the industrial area in the early stage, there are many unsafe links in the process of walnut production. Safety production technologies in prenatal, mid-production and post-natal production are briefly summarized.

1. Introduction

Walnut is one of the four major nuts in the world, and it has a long history of cultivation in China. In recent years, with the continuous expansion of the cultivated area, walnut has become the largest dried fruit cultivated tree species in China. With the continuous improvement of people's living standards, the demand for fruit production is also increasing.

There are many studies on walnut production: Deng et al. Summarized the situation of China's walnut industry in terms of walnut production, processing, and trade. China's walnut production has problems such as mixed varieties, low seed quality, low unit area output, and low processing technology. Luo et al. Analyzed the world's walnut production development and trade pattern and China's walnut production and sales situation using the statistics of the UN Food and Agriculture Organization. Feng et al. Put forward the research direction and development trend of walnut breeding and cultivation in the future.

This paper summarizes the whole production process from walnut orchard to harvest, which is divided into three parts, to provide a reference for the majority of fruit farmers in production. [1-3]

2. Preparation for the prenatal establishment of the garden

2.1 Pollination Tree configurations

The following principles should be noted when choosing: Pay attention to the flowering period of the varieties, avoid different flowering and fruiting times in the morning and evening, poor pollination, and different growth periods of orchard walnut trees, which will bring unnecessary trouble to management. The combination of female first and male first. Walnut belongs to the same plant species of heterosexual flowers. The combination of female first and male first can avoid the pollination problems caused by flowering and the impact on the yield of the orchard. There should be a certain interval between the maturity period of the main planted varieties and pollinated varieties, to facilitate the harvesting of varieties. In recent years, the consumer market has become increasingly demanding on walnut economic traits, which in turn have requirements on the purity of varieties. Xinjiang production area is doing very well, the main varieties are warm[1,2]

2.2 Seedling colonization

The seedlings in the garden should have a complete root system, no less than 12 whisker roots, and no diseases and insect pests. Walnut planting and establishment garden can be divided into autumn planting and spring planting, and the autumn planting time is from autumn defoliation to soil freezing. The spring planting time is from soil thawing to sprout, and different planting time can be selected according to different soil moisture. The selection of planting density varies according to the

selection of varieties: the planting density of middle and late fruiting varieties should be 4m×5m or 4m×6m, and that of early fruiting varieties should be 3m×4m or 3m×5m. Young walnut trees have weak cold resistance and are prone to freezing injury in winter and striping in spring. Therefore, the cold protection of walnut in the young tree stage is very important. Generally, the tree trunk base can be buried above the grafting interface, bagged irrigation soil protection, plastic film plus paper cold protection materials and other methods to protect walnut branches from cold through the winter. [3]

3. Management and maintenance of production Park in production

3.1 Orchard water and fertilizer management

3.1.1 Fertilization in the orchard

Base fertilizer should be applied mainly in autumn, the use of unrotten human and animal manure is prohibited, and it is forbidden to use harmless municipal waste or garbage containing harmful substances as orchard fertilizer. After the fruit is ripe and harvested in autumn, the base fertilizer is applied to the walnut trees in the garden by strip ditch application, hole application, and radial strip application, and the specific amount of fertilizer can be applied according to the amount of fruit hanging and the age of the tree. 26 young trees are supplied with organic fertilizer of 10 kg/kg. The first fruit tree was 40kg to 50kg, and the full fruit tree was applied according to the amount of fruit and fertilizer applied to the tree. It mainly composes fully mature farm manure and straw. [4]

3.1.2 Orchard topdressing

The topdressing of the walnut orchard is mainly concentrated in the period of rapid fruit expansion and fruit filling. The application of nitrogen fertilizer should be reduced to avoid unnecessary secondary branching in winter, and compound fertilizers rich in calcium, potassium, and zinc should be supplemented in time. Potassium, calcium and other mineral elements can also be supplemented by foliar spraying.

3.1.3 Walnut orchard irrigation

Orchards with irrigation conditions should be watered three times a year, before sprouting, during the period of rapid expansion of walnut fruit, and before the fallen leaves of the tree until the soil is frozen. Where there is no irrigation condition, film mulching and grass mulching under the orchard trees can be adopted to preserve soil moisture.

3.2 Tree shaping and pruning

3.2.1 Suitable tree shape

The trunk is sparse and layered. Suitable for well-managed orchards. With a central trunk, 6-8 main branches are retained according to the site conditions of the orchard, divided into 2-3 layers, and the layer spacing is 1-2 m. Lateral branches are selected on each main branch as a fruit branch group culture to avoid overlapping between the main branches. The three main branches are happy. Suitable for weak orchards. The tree has no central trunk and generally has 3 main branches. 3-5 lateral branches were cultured on each main branch for fruiting branch group culture.) The happy shape of multiple main branches. It is suitable for the transformation of older perennial walnut trees and old trees. This kind of tree often has already lost the central trunk, there is no hierarchy between the main branches, and the overlapping phenomenon is serious. 5-6 main branches with better position can be selected to expand the crown projection area in pruning to renew and rejuvenate the tree. [5]

3.2.2 Pruning time

The hollow branches of walnut are very prone to stripe and bleeding, so walnut pruning is usually pruned after harvest to before the fallen leaves of walnut, and when the buds sprout to the leaves of

the next year. These two stages of pruning can reduce the bleeding of walnut trees, and the wounds after pruning can be healed in the same year. [6]

3.2.3 Pruning measures and purpose

Pruning measures of the walnut orchard can be divided into thinning, cutting, shrinking, stretching, injury and adjustment. By taking different pruning measures for different trees, we can increase the number of branches, balance the true potential and adjust the yield. To achieve the purpose of early fruiting of young trees, high and stable yield of trees in full fruit period, and prolonging the fruitful life of old trees.

3.2.4 Main points of orchard pruning at different ages

Juvenile orchard, walnut juvenile orchard mainly refers to 1-4 orchards after planting. During this time, the orchards are mainly cultivated in tree shape, which can be dried and de-sprouted first after planting, in the same year or the second year after early-bearing walnut varieties are planted, and 2-3 years after late-bearing walnut planting. The fixed stem height is determined according to the different tree shapes selected. The height of the sparse layer of the trunk should be kept at 1: 1.2m. During pruning, attention should be paid to removing dense branches, withered branches, diseased branches, overlapping branches and crossed branches, to avoid competition for nutrition too close between the retained main branches. The construction during this period is mainly to cultivate the shape of the tree. the early fruit stage orchard mainly refers to the orchard of 5 ~ 8 years, during this period, the orchard pruning should not only ensure the fruit but also pay attention to the shaping and scaling of the fruit, to prevent the fruit from moving out. [7]

Pay attention to the coring of the secondary branches, cultivate the fruiting branch group, and remove the competitive excess branches from the main branches and lateral branches. The orchard in full fruit period mainly refers to the orchard in the full fruit period of more than 8 years and less than 20 years. During this period, attention should be paid to the renewal of fruit branch groups, the ratio of radial branches to fruit branches, to prevent the tree from weakening prematurely and retract the weak main branches properly. The side branches with room for development can be truncated to form a fruiting branch group. The aging orchard mainly refers to the orchard with long tree age and weak its potential for more than 20 years. In the orchard pruning in this period, attention should be paid to selecting strong branches to promote the development of heavy and short branches instead of the original main branches to realize the renewal and rejuvenation of old trees, remove excess branches and strengthen the tree potential.

3.3 Easily occurring diseases and insect pests and their control methods

3.3.1 Prevention and control principle

The principle of prevention of diseases and insect pests in the walnut orchard should be based on the principle of prevention, supplemented by spraying, and comprehensive control should be carried out. In the selection of drugs, biological pesticides, and botanical preparations should be selected, the use of chemical agents should be reduced, and the use of highly toxic, highly toxic and high residual chemicals should be prohibited. Cultivate more major natural enemies of insect pests in the garden to achieve effective biological control. The interval between application and harvest should be more than 30 days. [8]

3.3.2 Basic prevention and control measures

The orchard should be cleared thoroughly in autumn and winter, and the conditional orchards such as weeds, diseased branches, and diseased fruits should be plowed deeply to reduce the source of disease and insect pests in the orchard, and Bordeaux solution should be sprayed on the orchards with serious disease in that year. Winter trunk whitening can effectively reduce the harm of dry pests and can also play a certain role in cold protection. The whitening agent can be mixed with quicklime, sulfur, thickening agent (lard, soybean milk, etc.) And water. 5 °Be stone sulfur mixture was selected to sterilize the whole garden before bud germination in spring. [9]

3.3.3 Main pest control

Monochamus alternates. When small twigs are bitten and fresh in shape during the day, adults can be caught nearby and trapped by light at night. During the adult spawning period, it is found that there are spawning grooves in the trunk, main branches, etc., which can be slammed with an ax to kill the eggs or newly hatched larvae inside. When a defecation hole is found, a thin wire bent into a small hook is inserted from the wormhole, the larvae are hooked, and the wormhole is blocked with a poison swab. In August, 40% of Shachongjing 500-time solutions can be used to spray the crown, and the effect is also very good.

Beetles. Fully mature barnyard manure must be used as base manure, otherwise, it is easy to cause grub. When grubs are active on the surface, turn the soil at the right time and pick up insects immediately. Make use of the false death of the beetle to artificially kill the falling adults in the peak period; photographic beetles trap and kill the adults with a black light. Protect and make use of the natural enemies of the beetles, such as beneficial birds, hedgehogs, etc., can also be caught and killed by raising chickens between rows.

3.3.4 Prevention and control of major diseases

Walnut anthracnose. Remove diseased leaves and fruit immediately and burn them or bury them deeply to reduce the source of the disease. Spray 5 °Be stone-sulfur mixture before germination to eliminate overwintering pathogens. Spray 2 times 3 times of copper sulfates, lime, and water at the early stage of the disease, or 50% carbonizing 800 times, spraying at the young fruit stage is critical. Walnut root rot. The most effective way is to strengthen the tree. Improve disease resistance. The basic measures are: increasing the application of organic fertilizer and plant ash, preventing soil consolidation, adjusting planting depth, planing cool soil moisture, opening ditches and drainage, and promoting root aeration. Apply plant lime, quicklime or appropriate amount of ferrous sulfate to the rhizosphere soil to inhibit the occurrence of diseases. Root irrigation is carried out for those who are extremely weak. Effective agents for root irrigation are 3% Buccinia nail frost 500-time solutions and rooting powder (used according to the specified multiple). Each plant was irrigated with 1~2kg.

Walnut rot. Check frequently and scrape the spot in time as soon as it is found. Smear and disinfect with 50% methyl temperament wettable powder 50 times, or 50% carbonizing wettable powder, or 5-10 °be stone sulfur mixture, or 1% copper sulfate solution, and then apply Bordeaux solution to protect the wound scar had better be scraped into a diamond, the scratch should be smooth and smooth, To facilitate healing. The scope of scar scraping should exceed about 1cm of discoloring and necrotic tissue. Black spot of walnut. Spraying 5 °Be stone sulfur mixture before germination to eliminate overwintering pathogens; During the growing period, 12200 Bordeaux solution was sprayed with copper sulfate lime water (not mixed with acid pesticides) or 500 times 800 times solution of 50% methyl thiophanate wettable powder and 4000 times solution of 72% agricultural streptomycin soluble powder. (3) the harvest and treatment of walnut fruit should be harvested in time according to the different sales ways of walnut fruit.

4. Removal of the green peel of the fruit

When peeled walnut fruit is fully ripe, the peeled walnut can be peeled and removed green directly into the peeling machine after harvest in the garden. If the varieties in the garden are mixed, they can be retted for 2 days after a one-time harvest, and then removed by machine. After the peeling walnut is harvested, the peeled walnut is sprayed with 0.3%-0.5% ethephon and stacked according to the thickness of 50cm. The fruit pile is covered with hay or cotton cloth to keep warm and moisturized. After about 3 days, the walnut can be peeled. [9]

After the walnut is fully ripe, the walnut can be poured directly into the walnut de-greening machine and washed with clean water. Nuts should be dried in time after drying and washing, and they can be dried in an open and flat field under sunny weather conditions, generally 5 to 8 days. If the weather conditions are not good, you can also choose the intelligent drying room for drying. Secondary pollution in nut processing at present, kernel extraction is the main processing method in

walnut processing. As the processing form is mainly in small workshops, there are inevitably problems such as secondary pollution. Therefore, attention should be paid to the cleanliness and safety of the processing environment in nut processing to avoid pollution again. Walnut storage should pay attention to the temperature and humidity of the storage environment during storage. Nuts should be stored in ventilating and dry houses. If long-term storage is needed for sale in summer, choose controlled atmosphere cold storage. The temperature should be 1-2 °C to prevent deterioration. 5 days to start thinning, reduce the shelf useless branches, Keep the orchard ventilated and transparent, tie the vine in time, adjust the branches and fix them evenly on the shelf surface.

5. Conclusion

In summary, in order to improve the competitiveness of China's walnut products in the world market and ensure the healthy and orderly development of the walnut industry, it is necessary to change the traditional business model of blindly pursuing development area, blindly introducing new varieties, and replanting light pipes.

Through the establishment of standardized demonstration parks and high-quality nursery stock breeding bases, the use of scientific field management technology. Improve post-harvest processing and monitoring level, establish a modern walnut production, processing, and sales standardization system, thereby enhancing China's walnut market competitiveness.

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