

Management Techniques of Soil Moisture in Orchards

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Abstract

Soil moisture is very important to fruit tree growth, especially in arid and water-scarce areas, so it is very important to manage soil moisture in orchard. The commonly used techniques include water resource allocation, canopy water-saving, water-saving cultivation and so on.

Keywords

Soil Moisture; Apple Trees; Water Saving Cultivation.

1. Introduction

The spatial and temporal distribution of rainfall in the Weibei dry plateau was not consistent with the physiological water consumption period of fruit trees, making the contradiction between soil water status of orchards and water consumption of fruit trees more prominent. Proved to increase the irrigation area of our country's traditional agriculture USES epitaxial growth model and the planting ways now high water consumption has been difficult, in today's ecological environment conditions, a serious shortage of water, that can only inspire us how to improve the efficiency of water use, to go out in the path of agricultural water resources utilization and save (Zhou, 2007), Only in this way can we ensure the sustainable development of Weibei fruit industry.

2. Water Resources Allocation Technology

Agricultural production in the use of water resources need to cooperate with each other applicable to achieve the best use of water resources status, if can be in the water resources in agricultural production system of soil, fertilizer, air, water and the growth of the relationship between plant coordination is good, that they are in the best running state again, to its intrinsic hidden potential to maximum, To maximize the effect of agricultural water resources, which can also reduce the demand for external water, so as to achieve the highest possible yield with low input, and finally achieve the goal of low consumption, high yield and high quality in agricultural production (Zhou, 2007). At the same time, Zhou Mingyao et al. (2007) also put forward the idea of "precise irrigation", that is, fine and accurate adjustment of irrigation and fertilization, implementation of positioning prescription of water and fertilizer operation, and developed an information network management decision support system (FWMDSS) based on "collection, transmission, treatment, feedback and control" for efficient utilization of farmland

water. The system can be fully automatic to collect data, analysis of irrigation water management problems, automatic positioning autonomous control of the entire operation process, scientific and reasonable field irrigation and drainage operations, to fully improve the utilization efficiency of water in farmland. Regrettably, there is a general lack of irrigation conditions in Weibei area, and adequate storage of natural precipitation is the only water resources management measure.

3. Reduce Your Own Water Consumption Technology

Reducing the interception of tree canopy and the runoff intensity of land surface is conducive to adding more water to the soil. Increasing rainwater infiltration or inhibiting soil surface water evaporation is very beneficial to improving the availability of soil water in plant utilization. Reducing transpiration of plant community and improving soil water use efficiency are beneficial to alleviate and mitigate the damage of soil drought to plant growth. These factors are likely to eliminate or alleviate the harm of soil drought GanSaoHua even, as a result, all affect the canopy entrapment volume, soil water infiltration capacity, the surface runoff and soil water consumption factors, including the influence of soil water use efficiency of different types of vegetation, adjust the transpiration and soil evaporation of pruning, density control, Measures such as reducing canopy interception, stubble affecting soil evaporation and plant transpiration, and intertillage weeding affecting rainwater infiltration, soil evaporation and community transpiration may all affect the imbalance between soil moisture and plant growth (Guo, 2004).

4. Water Saving Cultivation Technique

For orchard soil moisture management, in the aspect of water-saving cultivation technology, one is to choose the key period of irrigation, the second is to apply some orchard cover technology, the third is to use the orchard grass technology, the fourth is the application of water-saving and water-conserving technology of chemical agents.

The four key time of irrigation is before germination: at this time, the soil irrigation can make good use of the nutrient resources stored in the soil in the first year, to promote the germination of buds and flowering and fruit setting, but also can expand the area of leaves and increase the photosynthetic effect of plants; Second, before the growth of new shoots: it is known that the young fruit expansion period and fruit tree new shoots are particularly sensitive to the water requirements, at this time is the key period of water supply, if the moisture content at this time is less, it will affect the ripening of fruits and the development of spring shoots; The third is the rapid fruit expansion period: at this time, sufficient water conditions can promote the increase of fruit size and correspondingly improve its yield, and is very beneficial to the differentiation of flower buds, but also provides a favorable early conditions for the next year's high fruit yield; Four is before freezing: In winter, generally have to be irrigation on soil, is known as irrigation water in winter, the water should be in front of the freezing soil in a timely manner, such ability in soil and its planting crops have the effect of keep out the cold and warm, the water have an advantage is that can improve the decay and decomposition of organic fertilizer, the winter trees to enhance the accumulation of nutrients, Prevent the occurrence of the phenomenon of winter strip (Niu, 2010). Generally speaking, the orchard mulching technology includes film mulching and grass mulching. Jian-xin liu et al. (2004) is an orchard grass this technology was studied, to grow with 12 years of red Fuji apple as the research object, the cover thickness has reached more than 10 cm, the results of the study, points out that compared with no to the soil (CK), covering grass measures covering grass been the highest temperature is reduced, and the lowest temperature of the ground soil increased; It can effectively keep the water in the soil and increase the soil water content, especially in the surface soil (0-20cm), which is relatively

significant. The nutrient quantity and organic matter content in the soil were increased. Improve the quality and yield of apples. The research of Sun Peng (2001) and Wang Xiaowei (2002) et al. also pointed out that after mulching the soil of apple orchards, the soil moisture content increased, the soil bulk density decreased obviously, and the content of organic matter in the soil also increased significantly. In addition, the grass planting technology for the orchard can effectively slow down the evaporation rate and intensity of soil surface, increase soil moisture content to a certain extent, and improve the microclimate around the orchard, so as to improve the quality of fruits and increase the income of fruit farmers (Lin, 2009; Xiang Zuoxiang, 2008; Tang Jun, 2007). In the aspect of orchard grass, special attention should be paid to the selection of grass species. Not all kinds of grass can effectively retain water, such as shade tolerant and adaptable grass species are better, and special attention should be paid to not have the same diseases and pests as nearby fruit trees. For example, in areas with drought and inconvenient irrigation, drought-tolerant grass species such as *Astragalus membranaceus* are suitable for grass cultivation (Niu, 2010). Regarding the use of chemical agents in water saving and water conservation, some chemical agents can reduce the transpiration of plants, so as to improve the water conditions in the environment and improve their utilization efficiency (Niu, 2010). In terms of water-saving irrigation technology, furrow irrigation, drip irrigation, sprinkler irrigation, micro sprinkler irrigation, infiltration irrigation, membrane irrigation, zonal irrigation or deficit regulation irrigation can be used timely and appropriately. There are still some orchard water-saving new technology, such as wastewater irrigation, saline water irrigation, which is to make full use of seemingly abandoned water, there is a new technology is to use some special device area collect excess water from the atmosphere, collection and irrigation for crops, this technique is commonly known as the atmospheric water technology (Niu, 2010).

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