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DRIP IRRIGATION INTENSIVE APPLE ORCHARDS AND SEASONAL WATER CONSUMPTION

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Annotatsiya

Today intensive gardening is expanding every year in many countries of the world. The leading states are China (44.45 million tons), the USA (4.65 million tons), Poland (3.60 million tons) and Turkey (2.93 million tons). In the leading countries in the cultivation and export of apple trees, 90-95% of the total number of apple orchards are undersized grafts, that is, intensive apple orchards. Drip irrigation systems are mainly used for watering these gardens. Today, drip irrigation is used on more than 6,769 million hectares of arable land worldwide [1].

Gardening is intensively developing in Uzbekistan. It is important to grow these orchards, establish the optimal watering regime, norms and deadlines, and determine the seasonal water consumption of intensive apple orchards.

Keywords: intensive garden, dwarf, stunted, semi-dwarf, drip irrigation, irrigation rate, depth of soil moisture, apple yield, marginal field moisture capacity.

Introduction

Large-scale work is being carried out in the republic on the introduction of advanced water-saving technologies in the cultivation of agricultural crops, the development of irrigation techniques and technologies that ensure the efficiency and productivity of irrigation water use to prevent water scarcity, and certain results are being achieved in this direction. In the "Concept of water management development of the Republic of Uzbekistan for 2020-2030"...modernization of water management facilities, ensuring their reliable operation and safety, Organization of management of large water bodies based on digital technologies, widespread introduction of

modern resource-saving technologies, improvement of water-saving irrigation technologies depending on soil and climatic conditions and the type of cultivated crops, expansion of research and design work to improve their efficiency and create new, stimulation of work on the introduction of new developments into practice.."a number of pressing issues have been identified [2].

When implementing these tasks, it is important to improve methods for calculating irrigation regimes, norms and timing for drip irrigation of intensive gardens.

It is in Uzbekistan that a number of our scientists, K.K.Musabekov, R.Abdullayev, K.S.Sultanov, F.O.Khasanov, K.I.Baymetov, K. Sh. Tajiboev, deserve attention when developing agricultural machinery, technology for the placement and cultivation of fruit orchards and vineyards.Temirov, Y.Javakyans, M.M.Mirzaev, M.M.Sattarov, B.Mirzokhidov, A.A.M. M. Kurmanov, B. Sh. Ulmasbayev, A.U.Aripov, T.E.Ostanakulov, D.M.Musaev, Sh.T.Yusupov, J. Fayzieva, etc [3,6,9].

Besides them, a number of scientists from the countries of the Commonwealth of Independent States work in this field: V.I.Rubgov, M.G.Agaev, V.N.Sukachev, T.A.Robotnov, Yu.L.Kudasov, K.G.Karichev, V.I.Budogovsky, V.K.Smikov, G.U.Alekseev, foreign scientists G.S.Boosie, C.Rop, Trotr, S.Verteist, P.Shutocher, K.Maurer, M.C.Parru, Man Osten, Engerton, D.V.Fischer, L.C.Lacville, D.J.Avrou, P.J. Chambers, E.V.Verpey, D.J.Avery, H.V.Barlow, K.A.Priestry, S.Weinbant, A.C.Dixon, R.C.Hutton, D.N.Madds, A.P.Preston, L.Witterlinder, R.L.Norton, M.N. The work of Westwood and others has been well studied in different time periods, as well as extensive research and development [3,4,5,8,11,13,14].

Nevertheless, in various soil and climatic conditions of Uzbekistan, practically no scientific research has been conducted aimed at scientifically substantiating the irrigation regime, criteria, elements of irrigation equipment aimed at preventing water scarcity in newly created intensive orchards, as well as seasonal water consumption of intensive apple orchards, identifying their impact on the yield of apple orchards [5,7,8,10,13,15].

Research Discussion

Scientific research on the cultivation of agricultural crops on irrigated lands, the determination of optimal agrotechnical measures, the introduction of water-saving

technologies are carried out in a number of countries around the world: Austria, USA, Canada, Israel, China, India and others, as well as in their research centers, research and higher educational institutions, namely in the US Department of Agriculture (USDA)., Food and Agriculture Organization (FAO), Colorado State University, University of California "Business and Irrigation" Institute (USA), Institute of Cotton Research (ICR, CaaS), Shehezi University (China), Stockholm University of Technology (Sweden), International Institute of Water Resources Management (Iwmi), (Sri Lanka), Australian Institute of Cotton Research (Australia), Indian Institute of Agricultural Research (India), International Organizations of Grapes and Wine (Movv), A.N.All-Russian Research Institute of Hydraulic Engineering and land reclamation named after. Kostyakova (Russia), Research Institute of Irrigation and Water Problems (Uzbekistan), Academician M.Mirzayev horticulture, viticulture and winemaking are conducted in international and local scientific centers, such as the Scientific Research Institute (Uzbekistan).

Currently, extensive work has been done on the development of new generations of drip irrigation technologies, the establishment of optimal norms and timing of irrigation of crops, scientists from foreign and domestic research and higher educational institutions, including A.M.Oleinik, M.K.Gadzhiev, A.S.Ovchinnikova, B.B.Shumakov, A.S.Shtanko, V.N.Shkura, D. L. Obumakhov, A. N. Ryzhakov, Vasiliev O.F., Degtyarev V.V., V.A.Rozhnov, Historian V., Mishuev A.V., Sladkevich M.S., Bakiev M.R., Bazarov D.R., Arifzhanov A.M. Bezborodov B.G., M.X.Khamidov, Kamilov B.S., Lunev B.G., Pulatov Ya.E., S.Isaev, R.J.Karshiev, S. Gapparov [11,12,16,18,19,20].

It follows from the above that when caring for intensive apple orchards grown in various soil and climatic conditions of our republic, it is important to establish a method of irrigation corresponding to the geological and hydrogeological conditions of the region, norms and timing of irrigation.

Research Methods

In the conditions of meadow-gray alluvial soils of the Tashkent region of the Republic, the breeding intensive apple variety "Golden" was irrigated in the order of 75-80-70% of the maximum field moisture capacity of the soil, providing moisture to the calculated soil layer of 1.0, 0.8 and 0.5 m.

Mazkur tajribalarda intensiv olma bog'larining sug'orish tartibi, me'yori va muddatlari, usuli va sug'orish texnikasi elementlarining intensiv olma bog'larning mavsumiy suv iste'moli hamda olma hosildorligiga ta'siri o'rganildi.

The results of the study

In the experimental field at the beginning of the growing season, the volume mass of the soil in the calculated layers of 0-50 and 0-100 cm was 1.28-1.39 g/cm^3. When studying the influence of the elements of the method and irrigation techniques on the volume mass of the soil by the end of the growing season, these indicators in the control variant are 1.34-1.43 g/cm^3, in the drip irrigation variant with a moisture content of the calculated soil layer of 0.8 m and 0.5 m of 1.34-1.42 g / cm^3. And with drip irrigation with provision of 0-50 cm in the soil layer of 1.33 g/cm^3, and 1.36 g/cm^3 in the soil layer provided with moisture of 0-70 cm.

In the experimental field, intensive apple orchards were provided with moisture calculated soil layers of 1.0 m, drip irrigation of about 75-80-70% of the maximum field moisture capacity 14 times, seasonal water consumption was 1200 m^3/ha. At a moisture rate of 0.8 m of the calculated soil layer 50-90 m^3/ha is watered 16 times, the seasonal water consumption is 1017-950 m^3/ha. Reducing the depth of soil moisture allowed to save seasonal water consumption up to 15-21%.

Also, the seasonal consumption of water, moisture and precipitation by intensive apple orchards was higher with drip irrigation of 0.8 soil layer (Fig.1).

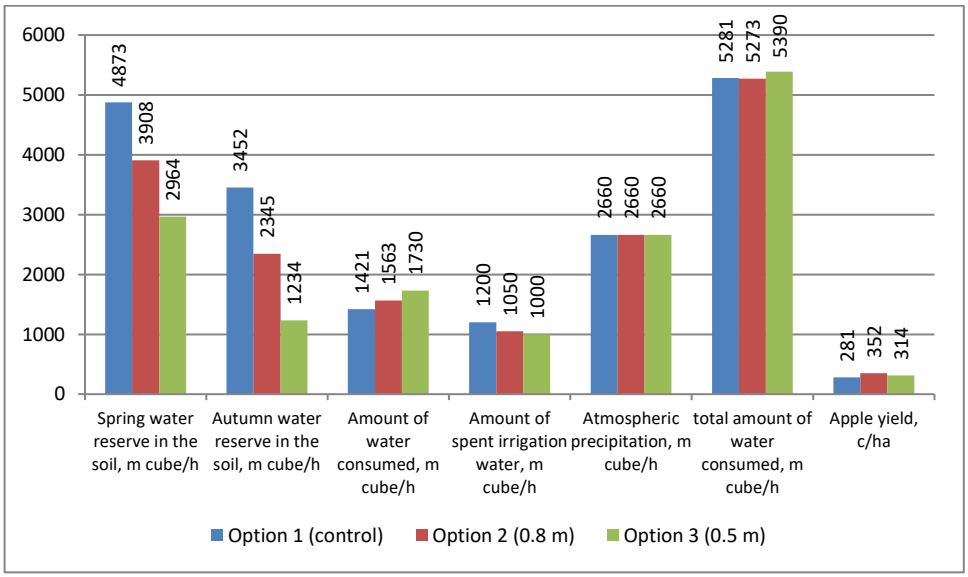

Figure 1. Seasonal water consumption of intensive apple orchards

The influence of the elements of the method, norms and irrigation techniques on the growth, development and yield of apple trees also varies by variants, control, i.e. with drip irrigation of the calculated soil layer of 1.0 m in the order of 75-80-70% of its marginal field moisture capacity, the number of two-year productive branches on an apple tree averaged 44 pieces, fruit yield-28.1 t/ha. With drip irrigation in this order of the calculated soil layer of 0.8 m, the number of productive branches was 53 pieces, the fruit yield was 35.2 t/hectare, which is 6 pieces and 3.8 t/hectare higher than with drip irrigation of 0.5 m of the soil layer, and 9 pieces and 7.1 t/hectare higher than with the control (fig. 2).

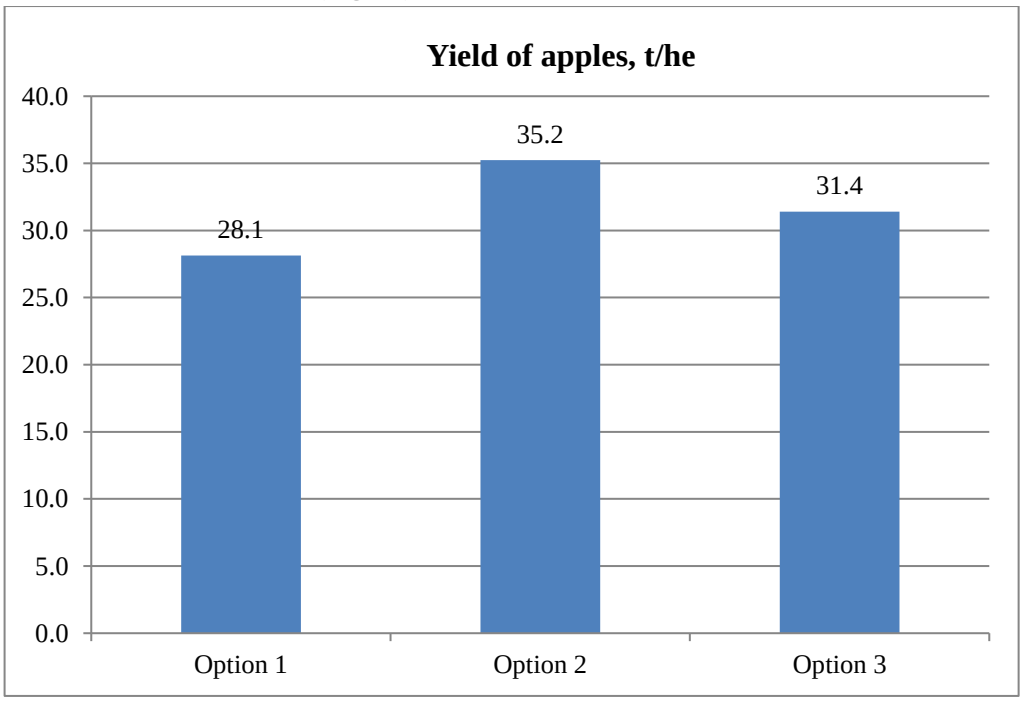

Figure 2. Yield of apple trees with drip irrigation

Recommendations

Today, in conditions of all freshwater soils of Uzbekistan with heavy water supply, medium and light mechanical composition, drip irrigation can be widely used to create intensive apple orchards and obtain a high yield of apples from them. And when establishing irrigation standards for intensive gardens, it is recommended to water 0.8 m of the soil layer at a rate of 40-70 m3 / hectare in the order of 75-80-70%.

Used Literature

1. Пакана бўйли олма етиштириш, 100 китоб тўплами, 49-китоб. «Агробанк» АТБ, Нашриёт уйи «Тасвир», Colorpack МЧЖ, 2021 й.
2. Ўзбекистон Республикаси Президентининг 2020 йил 10 июлдаги ПФ-6024-сон «Ўзбекистон республикаси сув хўжалигини ривожлантиришнинг 2020 — 2030 йилларга мўлжалланган концепциясини тасдиқлаш тўғрисида»ги фармони.
3. Kirsh, Yu. E., & Timashev, S. F. (1991). Fiziko-ximicheskie aspekty funksionirovaniya i konstruirovaniya membran dlya obratnogo osmosa. Zhurnal fizicheskoĭ khimii, 65(9-12), 2469.
4. Or, D. (1996). Drip irrigation in heterogeneous soils: Steady-state field experiments for stochastic model evaluation. Soil Science Society of America Journal, 60(5), 1339-1349.
5. Джавакянц, Ю. М. (2006). Эффективность обработки почвы в богарных и орошаемых садах Узбекистана. Садоводство и виноградарство, (6), 5-7.
6. Недвига, В. С., & Борисенко, М. Н. (2011). Методика определения сроков и норм поливов при микроорошении виноградников и интенсивных садов. Виноградарство и виноделие, 41(1), 31-33.
7. Shuravilin, A. V., Borodychev, V. V., & Krivoluskiy, A. A. (2012). Vliyanie rejimov kapelnogo orosheniya na rost i plodonoshenie yabloni v sadu intensivnogo tipa. Vestnik Rossiyskogo universiteta drujby narodov. Seriya: Agronomiya i jivotnovodstvo, (4).
8. Fazliyev, Z. S., Shokhimardonova, N. S., Sobirov, F. T., Ravshanov, U. K., & Baratov, S. S. (2014). Technology of the drip irrigation use in gardens and vineyards. The Way of Science, 56.
9. Кучер, Д. Е. (2015). Влияние режимов капельного орошения при возделывании яблоневого сада интенсивного типа. Международный технико-экономический журнал, (5), 111-118.
10. Овчинников, А. С., Бородычёв, В. В., Кучер, Д. Е., & Шуравилин, А. В. (2016). Капельное орошение яблоневого сада интенсивного типа на дерново-подзолистых почвах Московской области. Известия Нижневолжского агроуниверситетского комплекса: наука и высшее профессиональное образование, (2 (42)), 211-220.

11. Кирейчева, Л. В., Есенгельдиева, П. Н., & Мусабеков, К. К. (2017). Влияние капельного орошения на рост и развитие саженцев яблонь на карликовых подвоях в условиях Жамбылской области. Международный научно-исследовательский журнал, (2-2 (56)), 70-72.
12. Саримсаков, М. М., & Ибрагимова, Х. Р. (2018). Элементы технологии полива интенсивных яблоневых садов в условиях Узбекистана. Аграрная наука, (6), 66-67.
13. Imomov, S., Sultonov, M., Aynakulov, S., Usmonov, K., & Khafizov, O. (2019, November). Mathematical Model of the Processes of Step-By-Step Processing of Organic Waste. In 2019 International Conference on Information Science and Communications Technologies (ICISCT) (pp. 1-3). IEEE.
14. Овчинников, А. С., Сухарев, Ю. И., & Рябичева, Н. В. (2020). Управление водным режимом интенсивного яблоневого сада на шпалерной опоре в условиях Нижнего Поволжья. Научная жизнь, 15(9), 1174-1185.
15. Kaplin, Ye. A. (2020). Vliyanie omolajivaniya matochnыx rasteniy na produktivnost klonovыx podvoev yabloni. in agroekologicheskie aspektы ustoychivogo razvitiya apk (Pp. 458-462).
16. Kuznetsova, N. V. (2020). Kuznetsov Yu. V., Kozinskaya OV, Denisova MA The influence of hydraulic parameters on the quality of irrigation. Proc. of the Lower Volga Agro-University Comp, 2(58), 73-83.
17. Qayumova, L. S., Bekmurodov, U. B., Burieva, S. T., & Pulatov, G. E. (2021). Modern Technology of Irrigation of Garden Trees in Agriculture. International Journal on Integrated Education, 4(3), 223-224.
18. Khudaev, I., & Fazliev, J. (2022). Water-saving irrigation technology in the foothill areas in the south of the Republic of Uzbekistan. Sovremennыe innovatsii, sistemы i texnologii, 2(2), 0301-0309.
19. Abduraimova, D., Otakhonov, M., Jalilov, S., & Vokhidova, U. (2022, December). Hydraulic calculation lateral in drip irrigation. In IOP Conference Series: Earth and Environmental Science (Vol. 1112, No. 1, p. 012132). IOP Publishing.
20. Jurayev, A. K., Jurayev, U. A., Atamurodov, B. N., Najmiddinov, M. M., & Sobirov, K. S. (2022). Effective Use of Water in Irrigated Areas. Oriental renaissance: Innovative, educational, natural and social sciences, 2(6), 810-815.