

Fertilization and Pest Control Issues in the Development of Organic Agriculture

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Abstract: Agricultural prevention and control is the comprehensive application of a series of advanced agricultural technology measures to purposefully change certain environmental conditions. Create environmental conditions that are conducive to the growth and development of crops or fruit trees, as well as the survival and reproduction of beneficial organisms, but not conducive to the occurrence of diseases and pests. In order to directly or indirectly eliminate or suppress the occurrence and harm of diseases and pests, and achieve the goal of ensuring high yield of crops or orchards. This article further explores the issues of fertilization and pest control in the development of organic agriculture. Applying organic fertilizers based on their characteristics can ensure maximum fertilizer efficiency, provide the necessary nutrients for the growth of organic vegetables, and achieve the goal of soil improvement. Organic agriculture places greater emphasis on the standardization of agricultural product production, achieving quality and safety control and management of the entire production line from planting to dining tables, to ensure the health, harmlessness, and pollution-free nutrition of agricultural products. Due to the serious impact of pests and diseases on the growth of organic agriculture, it is crucial to strengthen the prevention and control of pests and diseases.

1. Introduction

With the continuous improvement of people's health awareness, more and more attention has been paid to the safety of agricultural production environment. In order to promote the development of healthy agriculture, improve the quality and safety of agricultural products and their competitiveness in the international market, break through the restrictions of green barriers in international trade and promote the sustainable development of agriculture, it is necessary to carry out the reform of traditional agriculture, so organic agriculture has been put forward. Compared with conventional agriculture, the biggest difference between organic agriculture and conventional agriculture is that the former pays attention to the standardized production of agricultural products, and carries out whole-process quality control from base to table to ensure the safety, nutrition and pollution-free of agricultural products, while the latter is obviously insufficient [1]. Agricultural prevention and control is to comprehensively apply a series of advanced agricultural technical measures to purposefully change certain environmental conditions. Create environmental conditions that are conducive to the growth and development of crops or fruit trees and the survival and reproduction of beneficial organisms, but not to the occurrence of pests and diseases. So as to directly or indirectly eliminate or inhibit the occurrence and harm of pests and diseases, and achieve the purpose of ensuring high yield of crops or orchards. Establish a healthy and sustainable agricultural production model based on nature, and its purpose is to maintain biological diversity and provide healthy and high-quality food for human beings without damaging the environment [2-3]. Organic agriculture pays more attention to the standardization of agricultural products production, and realizes the quality and safety control and management of the whole production line from planting to table, so as to ensure the health and harmlessness of agricultural products, nutrition and pollution-free. Because pests and diseases will seriously affect the growth of organic agriculture, it is very important to strengthen the prevention and control of pests and diseases. Due to the extensive use of chemical fertilizers, pesticides and other agricultural chemicals in modern conventional agricultural production, the environment and food are polluted to varying degrees, the natural ecosystem is destroyed, and the land production capacity continues to decline, resulting in a

series of new problems such as environment, resources, ecology and economic burden [4]. Organic agriculture is often harmed by various pests and diseases in the process of growth and development. If the prevention and control are not timely and the management is not in place, the problem of organic agriculture being harmed by pests and diseases will become more and more serious. Therefore, in order to ensure the normal production and good living environment of organic agriculture, the prevention and control of pests and diseases has become a top priority.

2. Fertilization pathways for organic agricultural soils

2.1. Increase the amount of organic fertilizer input

Fertilizer application is convenient and efficient, with immediate results, which has gradually weakened people's understanding of organic fertilizers and underestimated their investment. The source of organic fertilizer is insufficient, often due to the contradiction between fertilizer and grain, the planting area of green manure is gradually decreasing and the yield is low, as well as a large amount of crop straw is converted for other purposes, and the daily amount of straw returns is sharply decreasing. A good organic production system is the joint development of planting and breeding, which utilizes the manure of livestock to produce organic fertilizer. When designing the scale of breeding, it must be determined based on the size of the land area for planting crops. Due to the different fertilizer requirements of different crops in organic agriculture, for example, some crops require more potassium, while others have higher requirements for phosphorus fertilizer[5]. Organic agriculture is a sustainable agriculture based on organic fertilizers, and without sufficient organic fertilizer sources, nothing can be said about. Therefore, it is necessary to maximize the expansion of organic fertilizer sources and increase the amount of organic fertilizer input. The specific workflow is shown in Figure 1.

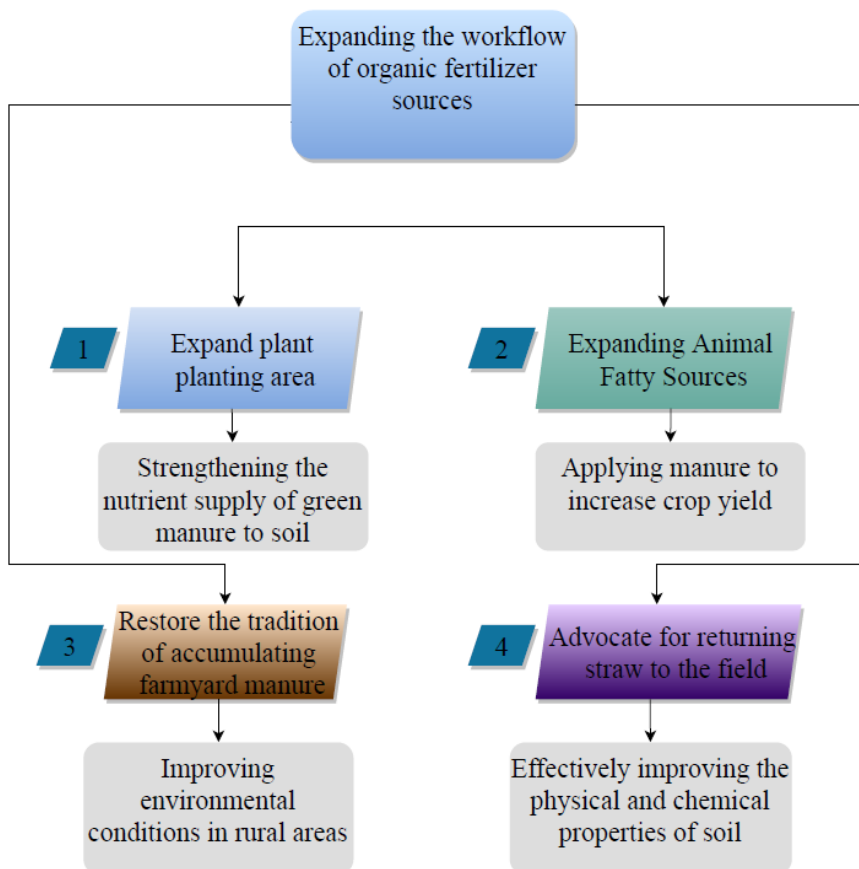


Figure 1 Workflow for Expanding Organic Fertilizer Sources

Therefore, it is not possible to rely solely on organic fertilizers for regulation. In many cases, inorganic mineral fertilizers are also needed for fertilization to meet the requirements of crop

growth. Before planting green manure, it is necessary to first arrange the variety structure of green manure according to the fertilizer requirements of different crops, and then select high-quality and high-yield green manure varieties that are suitable for the road, and scientifically plant and manage them [6].

2.2. Improve the application technology of biological fertilizer

Organic agriculture is different from chemical agriculture and traditional agriculture, but it comes from self-sufficient traditional agriculture. Organic agriculture means following the principle of sustainable development and the basic standards of organic agriculture. In the production process, synthetic fertilizers, pesticides, growth regulators and livestock feed additives are not used at all, and genetic engineering technology and its products are not used, but natural laws and ecological principles are followed [7]. Microbial fertilizer does not pollute the environment, and has the functions of fixing nitrogen, dissolving phosphorus and potassium, promoting the decomposition of organic fertilizer and increasing the number of beneficial microbial flora in soil. Animal fur, bones, meat, etc. without preservatives, as well as other by-products of food industry, are fermented or piled before use; Compost of culture waste from mushroom production; Plant ash; Fish meal and cake without chemical substances and chemical treatment [8]. Improve crop nutrition conditions, stimulate crop growth and development, resist pests and diseases, and play a variety of roles in soil potential fertility. However, the effect of microbial fertilizer is often different due to different crops and soil environments and improper application methods.

2.3. Reasonable application of elemental mineral fertilizers

In traditional agricultural production, a large amount of pesticides and fertilizers are used, which not only causes environmental damage and agricultural product pollution, but also consumes a large amount of non renewable resources, which is a serious waste of human resources. Due to the different fertilizer requirements of different crops, relying solely on organic fertilizer regulation is not enough. It is also necessary to supplement a certain amount of inorganic mineral fertilizers, such as adding mineral potassium fertilizer to crops that require more potassium, and applying phosphorus ore powder or calcined phosphorus fertilizer to crops that require more phosphorus. Crops that require more potassium need to be supplemented with potassium fertilizer, while crops that require more phosphorus can be supplemented with calcined phosphate fertilizer or phosphate rock powder. In addition, after treatment, dolomite, gypsum, lime, etc. can be reasonably applied according to the actual situation to balance soil fertility. Reasonable application can be carried out according to different crops and different soil conditions to ensure the balance of soil fertility. Improper use can compete with vegetables for available nitrogen, affecting early crop production. It is generally suitable for application when returning to the field, and requires the use of high nitrogen organic fertilizers, etc. Applying organic fertilizers based on their characteristics can ensure maximum fertilizer efficiency, provide the necessary nutrients for the growth of organic vegetables, and achieve the goal of soil improvement.

3. Characteristics of pests and diseases in organic agriculture

There are many kinds of pests and diseases in organic agriculture and their structures are complex. There are many varieties, with different designs and configurations, and some particularly unusual varieties. A variety of plant species, abundant quantity and ecological environment provide abundant food sources or hosts for the occurrence of pests and diseases, forming the unique species and structure of pests and diseases in organic agriculture. When planting organic crops, several kinds of crops are mixed and interspersed, which can interfere with the living habits of pests and diseases, weaken the adaptability of pests and diseases in alien crops, and reduce the harm of pests and diseases to crops [9]. In recent years, the development of organic agriculture is getting better and better. In order to better develop organic agriculture, some cities choose to plant exotic plants. In a short period of time, the growth of these plants is in a relatively good state, but after a period of time, there are phenomena of infection with pests and diseases and poor growth. This paper

summarizes the reasons for the occurrence of pests and diseases in organic agriculture, as shown in Figure 2 for details.

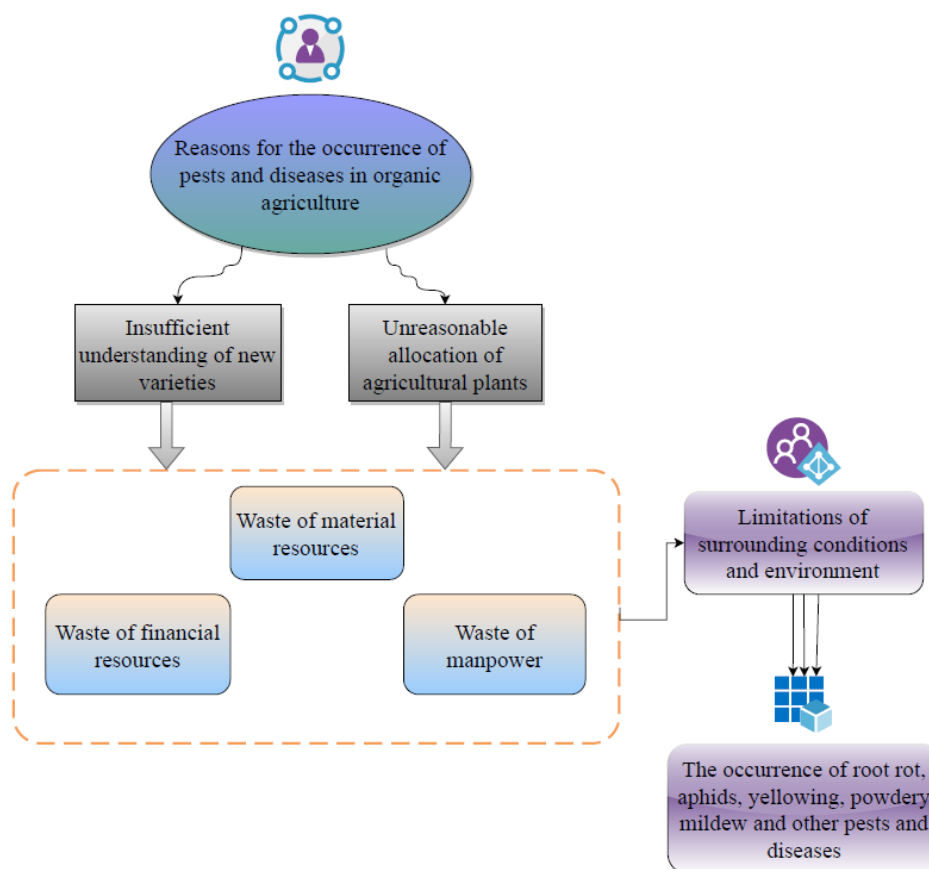


Figure 2 Reasons for the occurrence of pests and diseases in organic agriculture

The prevention and control of organic agricultural pests can be achieved through artificial methods or mechanical methods. Effectively utilize the patterns of disease and pest occurrence for targeted prevention and control, and use certain drugs to assist in prevention and control. The particularity of organic agriculture itself and its urban environment determines the particularity and diversity of pest control. Therefore, the prevention and control of pests and diseases must be adjusted at any time according to the occurrence trend and growth and decline dynamics of various pests and diseases, as well as the difference of affected plants or hosts, so that the prevention and control measures are flexible and changeable to ensure the effectiveness of prevention and control [10].

4. Prevention and control strategies of pests and diseases in organic agriculture

4.1. Only plants that pass quarantine inspection can be brought into the new area

When transferring plants, strict plant quarantine shall be implemented. If pests are found, they shall be treated with pesticides, and in severe cases, they shall be destroyed to prevent the introduction of new pests and diseases. Rational allocation of plant varieties on the basis of urban beautification should pay attention to solving the problem of pests and diseases in the long run. In addition, for the imported plants, we should have a comprehensive understanding of the plants before planting, so as to know whether the plants can adapt to the growing environment in this area and avoid pests and diseases. The key step to prevent pests and diseases is quarantine method, and only organic plant saplings that pass quarantine can be brought into the new area. Once saplings with pests and diseases are found, they should be treated immediately. Before entering the new area, they should be isolated and observed in the temporary nursery to strictly prevent saplings with pests and diseases from entering the new area.

4.2. Strengthen maintenance management

Strengthen normal management, change the ecological environment: irrigate reasonably, timely cultivate and weed, and regulate temperature and humidity. Combined with pruning, timely cleaning of pest and disease branches and leaves, centralized burning and removal, reasonable pruning, maintaining ventilation and transparency, reducing the harm of pests and diseases. Cultivating equipment should be disinfected before use to avoid repeated infections. The relationship between plants is very wonderful, as they are both interconnected and constrained by each other. So in planting, reasonable allocation can be made based on the relationship between plants, increasing mutual benefit and cooperation between plants, and controlling diseases and pests. Before cultivating organic plants, the soil should be thoroughly turned over to ensure its sterility and reduce the occurrence of pathogens. Effectively eliminate weeds in the plantation, reduce the survival rate of pathogens, and achieve the effect of preventing the occurrence of diseases and pests.

4.3. Use drugs to prevent and treat

In the prevention and control of pests and diseases, light, electricity and other organisms can be used to prevent and control pests and diseases according to their habits and particularities. Among many methods, this method is the simplest and most scientific, which has obvious effects and will not cause damage to the environment. Before burying the soil, brush the mixture of stone and sulfur on the roots of plants, and spray Bordeaux solution when the leaves of plant trees are released to prevent it. You can also use chemicals to irrigate the roots of plants to prevent the role of plant root nodule aphids. Promote the use of biological pesticides with less harm, which can not only eliminate pests but also reduce the harm to urban residents, and have a lasting effect and reduce the frequency of pesticide use.

5. Conclusions

Organic agricultural soil fertilization is a complex technical issue, and it is necessary to establish a systematic and holistic view of organic agricultural soil, comprehensively consider various factors such as fertilizers, crops, and soil, and establish the concept of "balanced fertilization". Organic agriculture places greater emphasis on the standardization of agricultural product production, achieving quality and safety control and management of the entire production line from planting to dining tables, to ensure the health, harmlessness, and pollution-free nutrition of agricultural products. Due to the serious impact of pests and diseases on the growth of organic agriculture, it is crucial to strengthen the prevention and control of pests and diseases. This article attempts to further explore the issues of fertilization and pest control in the development of organic agriculture. Organic agriculture refers to following the principles of sustainable development, following the basic standards of organic agriculture, and completely eliminating the use of artificially synthesized fertilizers, pesticides, growth regulators, and livestock feed additives in the production process. It does not use genetic engineering technology and its products, but follows natural laws and ecological principles. Through some simple analysis of the methods for preventing and controlling pests and diseases in organic agriculture, it is necessary to follow the laws of the ecological environment and use the principle of mutual benefit in nature to carry out the prevention and control of pests and diseases in organic agriculture. It must be easy to maintain and avoid large-scale occurrence of pests and diseases. Select appropriate prevention and control methods based on the characteristics of pests and diseases, achieve "prevention first, comprehensive management", fundamentally control the occurrence of organic agriculture pests and diseases, and ensure the healthy development of organic agriculture construction.

References

[1] Bn R, Patil R A, Ghangale T S, et al. Effect of different sources of organic fertilizers on nutrient status of soil and incidence of diseases and pests of sweet pepper (*Capsicum annum* L.) under protected condition[J]. AkiNik Publications, 2021, 38(11):56-77.

- [2] Guan L, Zhang J, Geng C. Diagnosis of Fruit Tree Diseases and Pests Based on Agricultural Knowledge Graph[J]. *Journal of Physics: Conference Series*, 2021, 1865(4):042052-042066.
- [3] Golijan Jelenagolijan. The Development of Organic Agriculture in Serbia and Worldwide. The Development of Organic Agriculture in Serbia and Worldwide[J]. *Contemporary Agriculture*, 2021, 70(34):85-94.
- [4] Abdullayeva S. Issues of Harmonization of Organic Agriculture and Plant Protection From Harmful Insects[J]. *Bulletin of Science and Practice*, 2022, 5(11):230-235.
- [5] Muwaffaq, R, Karajeh. Pre-harvest bagging of grape clusters as a non-chemical physical control measure against certain pests and diseases of grapevines[J]. *Organic Agriculture*, 2022, 38(14):28-63.
- [6] Liu J, Chen Z, Yu L, et al. Effects of Plant Secondary Metabolite Nicotine on Growth and Development of *Frankliniella occidentalis*[J]. *Research on Plant Diseases and Pests: English Version*, 2022, 009(002):21-54.
- [7] Zhang S Y. High Yield Techniques of Chili Pepper and Prevention and Control Measures for Diseases and Pests[J]. *China Fruit & Vegetable*, 2023, 46(20):31-55.
- [8] Yang D R, Zeng R, Jin-Ping L I, et al. Effects of YCB-II Cooperating with Fertilizer and Pesticides on Yield, Diseases and Pests Control of Tobaccos and Soil Improvement[J]. *Journal of Anhui Agricultural Sciences*, 2022, 15(3):16-27.
- [9] Burliai A, Burliai O, Nesterchuk Y, et al. Features of Organic Agricultural Products Functioning in EU and Ukraine[J]. *Visegrad Journal on Bioeconomy and Sustainable Development*, 2019, 8(2):63-68.
- [10] Costa J, Silva S, Silva A, et al. Development of 'Pérola' Pineapple (*Ananas comosus* vr. *Comosus*) Infructescence Under Organic Fertilization[J]. *Journal of Agricultural Science*, 2019, 11(13):274-289.