

Study on High Yield Planting Technology and Pest Control Technology of Wheat

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Abstract

Wheat is a very important food crop in our country, and its output has a direct effect on agricultural economic development. In recent years, the improvement of wheat planting quality and yield has made good achievements, but from the perspective of crop planting and management, how to achieve high-yield wheat planting and do a good job of disease and pest control is still very important research content. This paper briefly analyzes the problems and related technologies in wheat planting, disease and pest control.

Keywords

Wheat; High-yield planting techniques; Pest control techniques

Introduction

With the development of the times, the living conditions of Chinese residents have significantly improved. In grain production, people's demands for wheat yield and quality have become increasingly stringent, and some regions have expanded wheat planting areas. However, during the wheat planting period, some issues still affect its yield and quality. Therefore, when planting wheat in different regions, comprehensive consideration should be given to various local factors, and scientific planting techniques should be selected to improve wheat yield. At the same time, appropriate pest and disease control measures should be implemented to improve wheat quality and yield, thereby achieving higher economic benefits.

1. Problems in Wheat Planting and Pest and Disease Control

1.1 Wheat varieties are becoming more diverse

With the advancement of science and technology, more and more technologies are being applied to agricultural production. Through long-term research and development, China's wheat varieties are becoming increasingly diverse. This situation can effectively promote the development of wheat cultivation technology. However, in actual cultivation, farmers are limited by their knowledge and understanding, and still use traditional methods to cultivate wheat and control pests and diseases. As a result, new wheat varieties are affected by external environmental factors and pests and diseases in actual production, resulting in reduced wheat yields.

1.2 Serious pest and disease situation

Climate conditions and other factors can have a serious impact on wheat yield and quality, especially pests and diseases. Farmers lack a sense of innovation during wheat planting and have a shallow understanding of relevant knowledge. During the planting process, they do not carry out targeted planting and pest and disease control work in accordance with local conditions and wheat variety characteristics, resulting in serious risks of wheat pests and

diseases, which not only reduces the effectiveness of disease control, but also causes a decline in the economic benefits of wheat [1].

1.3 Lack of advanced planting technology

Despite rapid growth in China's agricultural economy in recent years, most farmers still have low incomes and outdated planting techniques. Many new planting techniques and pest and disease control measures have struggled to achieve widespread adoption, and farmers often take a long time to adopt these new measures and technologies. This situation impacts wheat cultivation, yield, and quality. Furthermore, when pests and diseases do occur, traditional control methods are limited in scope and are inadequate to address the increasingly diverse nature of these conditions. This will inevitably lead to severe constraints on wheat production over the long term.

1.4 Pesticide abuse

At present, there is a serious problem of pesticide abuse in wheat cultivation in China. Most farmers use pesticides with strong side effects to spray wheat, especially during the period of pest control. In order to achieve the ideal control effect, some farmers will adopt the method of spraying pesticides in large doses for control. However, from the actual application effect, this method is not only difficult to achieve the ideal disease control effect, but also seriously affects the yield and quality of wheat. There is a risk that wheat will become "toxic wheat", threatening people's health. At the same time, it will also cause farmers to suffer certain economic losses [2].

2. High-Yield Wheat Planting Technology

2.1 Selecting superior wheat varieties

Scientific and rational wheat variety selection is the key to increasing wheat yields. Therefore, before planting wheat, growers must pay attention to variety selection, focusing on the following two points: first, choose high-quality varieties with strong wind and disease resistance whenever possible; second, analyze the wheat growth environment. During variety selection, relevant personnel should conduct on-site inspections of the wheat production environment and, based on the actual local conditions, select suitable wheat varieties for planting, thereby ensuring the rationality and scientific nature of wheat planting. For example, in areas with little rain and drought, wheat varieties with strong cold resistance should be selected; in cold areas, varieties with strong cold resistance should be selected. Only by adapting to local conditions can wheat yields be increased.

2.2 Scientifically adjust the planting area

Before wheat planting, relevant personnel must prepare the land in the area. Wheat has a long growth cycle and has high requirements for the production environment. Therefore, planting personnel must prepare the land according to the growth needs of wheat. For example, in arid and rainy areas, planting personnel are required to strictly follow relevant standards and control the working area to 20cm-25cm. This standard can effectively enhance the soil's planting capacity and improve soil permeability, which is conducive to wheat growth and will not cause excessive damage to the land [3].

2.3 Sowing at the right time and in the right amount

Wheat sowing time has a significant impact on strong seedling development, safe wintering, and high yields. Planters should select the appropriate sowing date based on the wheat variety and planting region. As the saying goes, "White Dew comes early, Cold Dew comes late; the Autumnal Equinox is the perfect time for wheat planting." For example, in cold weather areas suitable for winter wheat cultivation, sowing can generally begin when the average daily temperature is between 16°C and 18°C, with the optimal sowing period being September 15th to 22nd. During actual sowing, planters should determine the minimum seedling count based on the variety's characteristics and determine the actual sowing rate based on factors such as the minimum seedling count, thousand-grain weight, seed germination rate, and field emergence rate. Typically, the minimum seedling count is 160,000 to 200,000 plants per 667 m², with a sowing rate of 10 to 12 kg per 667 m². Early sowing should be less, while late sowing should be more. For every three days of delayed sowing, the sowing rate should be increased by 1 kg per 667 m².

2.4 Do a good job in fertilization management

Fertilization is the key to improving wheat quality and yield. In wheat planting, planters should carry out corresponding fertilization management based on the actual conditions of wheat, scientifically regulate the amount of different fertilizers, and carry out targeted allocation of fertilizer nutrients according to wheat varieties, so as to improve soil nutrients as much as possible, so as to meet the growth needs of wheat. At the same time, wheat needs vary under different climatic conditions. In order to ensure sufficient base materials, wheat needs a stable and long-term supply of growth nutrients. When there is a lot of rain, the nutrients in the soil will be lost with the water. Therefore, planters must strengthen soil nutrients. Only by doing a good job of fertilization management can the utilization rate of fertilizers be improved, the nutritional needs of wheat during growth can be guaranteed, and wheat yield can be increased [4].

2.5 Strengthening field management

During the wintering of wheat, the purpose of field management is mainly to ensure that wheat production can survive the winter normally and safely. After the wheat seedlings emerge, the planting staff should control the number of wheat to avoid sparse or overcrowded wheat. If the winter temperature is higher than the average temperature of the same period, the planting staff should prevent the planting group from being too large. If the climate is dry that year, the planting staff should pay attention to increasing the amount of irrigation and the number of irrigations. Relevant personnel should flexibly use the above methods to ensure that the wheat survives the winter safely. After the Spring Festival, the wheat enters the heading period. During this process, the focus of field management becomes water and fertilizer irrigation. Planters need to cultivate the land before the wheat joints. In particular, for wheat with more prominent growth, they should strengthen the cultivation to reasonably control the growth of wheat; for wheat with poor growth, they should carry out irrigation and fertilization in time. For planting areas with more fertile land, planters should control the amount of fertilizer after the wheat turns green, so as to adjust the growth rate of wheat and enhance the wheat's resistance to lodging [5].

2.6 Optimizing irrigation technology

Irrigation is a major factor influencing wheat yield. Therefore, during the wheat planting process, the growth cycle should be scientifically controlled. Planters should also closely monitor the natural precipitation in the wheat growing environment and adjust irrigation schedules based on precipitation to ensure that the wheat is adequately hydrated. When rainfall is high, irrigation frequency should be reduced; when rainfall is low, soil irrigation should be increased to prevent soil drought from affecting wheat growth.

2.7 Do a good job of harvesting

Harvesting is the final stage of wheat planting. In order to ensure the yield of wheat as much as possible, planters should choose to harvest at the mature stage and make good preparations for harvesting. First, harvest wheat in the mature stage in time. The main sign of wheat maturity is that the stems have high water content, are golden yellow, and are elastic. In this stage, the water content of wheat is extremely sufficient. If harvesting is carried out after the mature stage, it is easy to cause grain shedding, resulting in reduced wheat yield. In modern agriculture, compared with manual harvesting, mechanized equipment procurement efficiency is higher and it reduces the occurrence of grain shedding. Therefore, during the wheat harvesting process, planters can use harvesters combined with manual labor to carry out harvesting work, thereby ensuring the quality of harvesting [6].

3. Wheat Disease and Pest Control Technology

3.1 Physical prevention technology

Physical control technology is a method of pest control. In actual application, this technology is usually used in conjunction with manual weeding technology. Timely removal of weeds in wheat fields can increase the oxygen content in the air in the wheat growth environment and enhance soil fertility, thereby achieving pest control effects. In wheat fields, weeds grow at a relatively fast rate. If the frequency of weed removal by planters is low, it is very easy for weeds to multiply in the field. This will affect the microbial components in the soil, causing pests and diseases to breed, causing wheat to be attacked by pests and diseases, and resulting in reduced wheat production. When

applying physical control technology during wheat planting, planters should understand the growth characteristics and pest and disease characteristics of wheat in advance, select appropriate physical control methods based on the physiological characteristics of pests and diseases, and lure pests to the designated location for killing at one time. Although physical control technology will not have a significant impact on the natural environment, it requires a high level of human and material resources during actual application [7].

3.2 Chemical control technology

Some studies have found that food losses due to pests and diseases account for approximately a quarter of global grain production. Currently, over 1,000 species of pests and diseases have been identified worldwide. If they are widespread, they can lead to reduced crop yields. During wheat cultivation, chemical pest control primarily involves the use of pesticides to mitigate damage to wheat growth caused by pests and diseases. In China, chemical pest control is widely used and has proven effective in controlling pests and diseases, increasing wheat yields. While pesticide application is relatively straightforward, the effectiveness of individual pesticides varies considerably. During pesticide application, growers typically ensure that the pesticide penetrates the wheat roots and stems to effectively prevent pests and diseases. Aphids are a common pest during wheat growth, and growers typically use acetamiprid to control them. For midges, growers typically apply a layer of phoxim-poisoned soil to the soil before wheat ears emerge. This effectively removes midges and prevents them from pupating. During the heading stage, wheat is at its peak pest and disease risk. Farmers typically spray trichlorfon and other pesticides to control aphids and leaf-feeding insects. These methods are all effective in eliminating pests and diseases. Wheat is also highly susceptible to diseases, including common wheat rust and wheat head blight. To combat wheat rust, growers should address the root cause and choose resistant wheat varieties whenever possible. Before sowing, seed dressing should be carried out: 60g-100g of triadimefon (15%) should be added to every 5kg of wheat seed, using a 10:1 ratio of seed to water. After dressing, the seeds should be allowed to rest for a period of time, typically four to six hours, before sowing. Finally, if wheat rust develops, immediate treatment with pesticides is essential. Commonly used pesticides include propiconazole and carbendazim. Triadimefon emulsifiable concentrates should be used strictly according to the instructions and can be combined with other pesticides or diluted with water. For wheat fusarium head blight, first, the planting staff should closely observe the condition of the wheat field. If the disease is found, the drug control should be carried out immediately. Secondly, the planting staff should pay attention to the rationality of the drug use. Because the onset time of wheat fusarium head blight cannot be effectively determined, the planting staff should carry out corresponding prevention work from the beginning of the wheat growth period. Dilute methylpolypyridamole and etherbactam and spray them on a large area in the wheat field once a week. At the same time, the planting staff can also take measures such as spraying polyester pesticides to prevent the disease, ensuring that the drugs stay on the surface of the wheat and form a protective barrier, thereby enhancing the disease resistance of wheat and ensuring wheat yield and quality. When using chemical control technology in the wheat production process, weeds in the field should be removed in time. Weeding is the basic work to increase wheat yield. If weeds in the field cannot be removed in time, wheat will easily reduce its own yield due to insufficient nutrients. Therefore, during the wheat planting period, the planting staff can also take measures such as spraying herbicides to inhibit the growth of weeds in the wheat field [8].

3.3 Biological control technology

Biological control technology is a green pest control technique currently being promoted and widely adopted in China's agricultural production. While achieving relatively effective pest control, it also minimizes environmental impact. Using biological control requires minimal initial capital investment. Simply deploying natural enemies within the wheat-growing area can effectively eliminate the pest populations that arise during the wheat's growth period. This natural enemy suppression not only reduces the pest habitat but also rapidly reduces pest numbers, mitigating the impact of pests on wheat growth. Furthermore, biological control can be combined with chemical control techniques to further enhance pest control effectiveness. Furthermore, the presence of microorganisms in wheat fields can provide sufficient nutrients for pests to reproduce. Therefore, farmers should also use pesticides that inhibit pest reproduction to control pest populations and mitigate their impact on wheat growth.

3.4 Seasonal prevention

Wheat growth is affected by the seasons. Therefore, in order to increase wheat yields, planters must also take proactive preventive measures. Wheat spring is a critical period for wheat growth. After winter ends and spring begins,

wheat and field soil are usually exposed to sufficient sunlight. This will make the internal nutrient structure of the soil more uniform, and wheat will then quickly enter a full growth stage. During this stage, planters should continue to improve their proactive management awareness. If problems are found in field management, effective measures should be taken in a timely manner to deal with them, so as to prevent wheat from being affected by pests and diseases on a large scale when it enters the late growth stage, resulting in a reduction in yield [9].

4. Conclusion

To sum up, wheat yield and quality depend on planting techniques and the application of pest and disease control technologies. Therefore, if we want to ensure the healthy growth of wheat, growers must take targeted prevention and control measures based on the local planting environment, common pest and disease types, etc., so as to ensure wheat yield and quality and enable growers to obtain higher economic benefits.

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