

Application of Mechanized Conservation Tillage Technology in Dry Land

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Abstract

Review Article

China is a large agricultural country, and traditional farming methods have always been a little more extensive. This predatory production has led to further deterioration of the ecological environment. With the continuous development of mechanized protective farming techniques in dry fields, China's agricultural development has made a qualitative leap. The specific performance is to reduce agricultural production costs, protect the ecological environment, and increase farmers' income. To ensure sustainable development of mechanized conservation tillage in a dry land, it is necessary to promote conservation tillage in dry land according to local conditions. This paper will discuss the technology and application of mechanized conservation tillage in dry land according to the requirement of popularizing mechanized conservation tillage.

Keywords: dry land mechanization; conservation tillage technology; key points of application.

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INTRODUCTION

To improve the quality and efficiency of farming, the use of conservation field farming techniques must adhere to the basic principles of the first experiment and then trial promotion, and comprehensively investigate the data of soil moisture content, organic matter content, plow layer thickness, and other aspects of conservation field farming. Use extensive data to support the promotion of subsequent technologies. Carry out extensive publicity and education activities in the village regularly, provide farmers with various free technical training, ideologically reverse their conscientiousness of mechanized protective farming techniques in dry fields, and psychologically agree with this new farming method. The promotion of conservation tillage technology is relatively complicated, including fund raising, technical support, and other aspects. Grass roots industrial institutions need to strengthen communication with relevant government departments to make sure the quality and efficiency of promotion [1].

Main technical forms of mechanized conservation tillage

The first is no-tillage fertilization and sowing. No-tillage seeders are used to sow directly in the stubble field, and no other cultivation operations will be carried out except for sowing and spraying of chemicals. The second is straw and stubble mulching

technology. Covering the ground with more than 30% of straw residues can improve soil fertility, decrease soil water evaporation rate, and reduce wind and water erosion. The third is the prevention and cure technology of pests and weeds. The prevention and control of pests should be both timely and accurate, mainly relying on the prevention of seed dressing of pesticides, and spray insecticides in time when pests are found. Herbicide, artificial, and mechanical methods can be used for weeding. The fourth is the soil mechanical subsoiling technology. Through subsoiling, breaking the bottom of the plow, improving soil permeability, and increasing the penetration rate of precipitation, it can help the progress of crop root respiration and increase crop yield.

Main points of implementing mechanized protection tillage technology in a dry field

Farming methods

In the process of dry land farming, the farming methods of selecting all times to uphold the principles of farming and increasing the water storage layer in the cultivation process cannot damage the surface of the soil coverage. According to the above requirements, the current protection dries mechanized farming methods mainly in two ways. The first is no-tillage, without any tillage on the dry field, sowing directly on the stubble field; the second is to carry out deep mechanization of soil mechanization once every two to three years [2].

Seedbed treatments

Seedbed treatment is to increase the emergence probability of corn without damaging the surface straw cover, and put forward measures specifically for corn planting. The process of seed bed treatment is as follows: First of all, the seed is sown directly in the stubble field, then the soil surface is loose, the weeds and crop stubble are treated, and then the crop Straw and soil are mixed to do the shallow rotation work.

Straw mulches

Straw mulching means that after the crops are harvested, the land that has not been cultivated is directly covered with the straw of the crops evenly on the ground surface to form a land protection layer, in this way, not only the evaporation of soil water can be reduced, but also the soil structure can be improved and the soil fertility can be increased. Covering with corn stalks is the most common situation. There are two main methods: the first is to directly cover the harvested corn stalks on the ground without crushing. The second is used by the harvester to crush the corn stalks, and then the crushed straw covers the ground evenly[3].

Scientific selections of tillage equipment

In recent years, the level of agricultural mechanization has been continuously improved. To make mechanized conservation tillage technology of dry land accepted by the people and improve its quality and efficiency, it is necessary to pay more attention to the tillage tools and select the tillage tools scientifically. Through a large amount of data analysis, there are two types of machines that are currently the most critical for the use of mechanized protective tillage technology: one is a no-tillage planter, and the other is a special deep-cultivator. These two machines should be selected according to the soil conditions and the need for the operation. To ensure the improvement of the overall efficiency of the product and the effectiveness of the operation.

Determining planting patterns

At present, two accepted planting patterns are wide and narrow row cutting stubble fallow and Ridge and side Ridge fallow respectively. Fallow with wide and narrow rows of stubble can create good conditions for fertilizing, watering and other operations in the later period, and can effectively improve the lodging resistance of plants, it is found that the latter is more suitable for farmers' planting habit in the course of popularizing and applying the technology of conservation tillage in dry land at present.

No-till sowing

No-till sowing is an important method of mechanized conservation tillage in a dry land. Compared with traditional tillage, there are higher requirements for sowing temperature and plant spacing, the outside temperature should be stable at 10 °C when sowing, and the plant spacing should be determined

according to the plant variety. The quality and efficiency of no-tillage sowing can be improved effectively only when the temperature and plant spacing are within the required range, to ensure that the benefits of mechanized conservation tillage in dry land can be maximized.

Analysis of practical examples of mechanized protective tillage techniques in dry fields in mountainous and semi-mountainous areas

Regional characteristics analysis

In the past, the mountainous and semi-mountain areas used predatory farming modes, including simple shallow tillage, the use of chemical herbicides, and the use of a large amount of chemical fertilizers to improve soil fertility, which resulted in changes in soil structure. The plow bottom moved up. The active soil became shallow, and the over-standard use of herbicides and fertilizers resulted in a serious decline in crop yields and poor soil fertility. This simplified farming model, with the continued use of fertilizers and herbicides, is reducing yields year by year, in order to restore soil organic matter in the mountainous and semi-mountain areas and increase crop yields. Sustainable farming has been made possible in the mountainous and semi-mountain areas by using conservation tillage in dry land and using straw in the fields to reduce the use of chemical fertilizers.

Technical points

The application of mechanized conservation tillage techniques in mountainous and semi-mountain areas is as follows: corn harvester harvests crops and crushes straw to cover the ground-subsoiling soil preparation-soil and crushed straw mixed land preparation-using multifunctional land preparation machine to deep fertilize and ridge --sowing. In a certain area, when carrying out conservation tillage on upland fields, the corn harvester with strong pertinence was selected. The model is Kensheng 4YZ-3. The depth of subsoiling is strictly controlled in the range of 30-35cm utilizing interval subsoilers. According to this standard, the bottom layer of ploughing can be broken and the water storage capacity can be improved. The land is broken and mixed by using a multifunctional soil preparation machine with deep fertilization equipment. It is also necessary to control the working depth in the range of 28-30cm, and the diameter of the clouds should not be more than 1.5cm. Fertilization was carried out at a depth of 18-22cm under the seedbed, and the ridge height was controlled at a depth of 20-25cm. In this standard state, the state to be sowed can be reached evenly suppressed once.

Subsoiling site preparation: select spacing subsoiling. When working, the subsoiler can loosen the ridge, break the bottom of the plough, improve the permeability of the soil. The roots of crops can grow down and extend under drought conditions. The

groundwater can permeate up to alleviate the drought of the soil. It also allows surface water to seep down during the rainy season, creating a reservoir of water in the soil that feeds the crop.

The shallow soil layer in mountain area and Mid-Levels is not suitable for deep turning, so the corn Straw should be crushed within 4 cm in length when returning the crop Straw to the field, and after the crushing, evenly spread on the ground and directly carry out land preparation. In the process of crushing and mixing the ground, the operation depth and the uniform crushing and mixing must be ensured to ensure that all the straw is returned to the field effectively.

Application effectiveness

By saving energy and increasing efficiency, improving soil fertility and reducing fire, the application of mechanized conservation tillage technology in dry land in mountainous and semi-mountain regions can bring considerable economic, social, and ecological benefits.

Compared with the traditional farming methods, the use of dry field mechanized protective tillage technology can reduce the use of chemical fertilizers and increase the content of soil organic matter. Planting corn can save the use of chemical fertilizers by 15-17. 5kg per mu, and the cost of chemical fertilizers is 50-52 yuan. The operating cost is 45 yuan, and a total savings of 95-97 yuan per mu; corn can be increased by 40-45kg per mu, and the yield increase is 50-60 yuan. Total cost savings and efficiency increase of 145-147 yuan per mu.

By adopting the technology of mechanized conservation tillage in a dry land, the corn Straw can be directly broken up and mixed into the soil without burning. Avoiding the forest and other fire situations

caused by burning the crop straw can protect the lives and property of farmers.

The adoption of mechanized conservation tillage in dry land can increase the content of soil organic matter, effectively improve the soil structure and make the land recyclable to avoid the impoverishment of the soil caused by traditional predatory farming methods.

CONCLUSION

China is a large agricultural country, but also a country with a large population. The area of cultivated land per capita is small, and the demand for crop output and quality is relatively large. However, traditional farming methods have caused the continuous deterioration of the agricultural ecological environment in China, which restricts the output of crops. To achieve sustainable agricultural development. New protective farming methods must be explored. Promoting the application of mechanized protective farming techniques in dry fields can effectively solve this dilemma and open up new paths for the development of my country's agriculture.

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