# Analysis of Orchard Soil in Longxian Company of Shaanxi Fruit Group

Xiaohui Cao[1, 2, 3, 4, *], Meng Yuan[1, 2, 3, 4], Yutong Zhao[1, 2, 3, 4]

[1]Shaanxi Provincial Land Engineering Construction Group Co., Ltd. China

[2]Institute of Land Engineering and Technology, Shaanxi Provincial Land Engineering Construction Group Co., Ltd. China

[3]Key Laboratory of Degraded and Unused Land Consolidation Engineering, the Ministry of Natural Resources, China

[4]Shaanxi Provincial Land Consolidation Engineering Technology Research Center, Xi'an, Shaanxi 710021, China

## Abstract

To comprehensively understand the status quo of the orchard soil of Shaanxi Fruit Group Longxian Company, and provide a theoretical basis for formulating fertilization. In mid-to-late July 2020, five orchard Soil Samples (sampling depth of 0-40cm) from the orchard of the Longxian Company of Shaanxi Fruit Group were ir-dried and ground, and then analyzed for soil acidity and alkalinity, texture and nutrients. The soil texture of the orchard of Shaanxi Fruit Group Longxian Company was silt loam, which was alkaline. The maximum content of available phosphorus is 9.2 mg/kg, the minimum is 1.2 mg/kg, and the average is 4.9 mg/kg. The content is concentrated at a very low level; the maximum content of available potassium is 237 mg/kg and the minimum is 104 mg/kg, average 149 mg/kg, the content is concentrated at a low level; total nitrogen content is 0.63~0.98 g/kg, with an average of 0.84 g/kg, which is at a medium level; organic matter content is 7.9 to 16.6 g/kg, which is at a medium level. It is recommended to increase the application amount of phosphate fertilizer and potassium fertilizer in the future fertilization process, and maintain or appropriately increase the application amount of nitrogen fertilizer.

## Keywords

Longxian; Orchard; Soil Nutrients.

## 1. Introduction

Longxian County is located between Guanshan Mountain and Ganshan Mountain in the west of the Weibei Dry Plain. Long sunshine hours and large temperature difference between day and night are beneficial to apple cultivation and sugar accumulation. In recent years, with the improvement of the quality of life, consumers are more concerned about the appearance quality, The taste and inherent nutritional requirements are also getting higher and higher[1-3]. Studies have shown that soil is the mother of fruit trees, and soil nutrients are the milk of fruit trees. orchard soil The soil has good physical and chemical properties and high soil fertility, which is conducive to the growth and absorption of fruit tree roots, and is of great significance for improving fruit yield and quality[4-9]. Nutrient imbalance will not only lead to stunted crop growth and yield decline, but also cause environmental pollution[10]. Therefore, in July 2020, this study was conducted on the Longxian 5 The soil nutrient status of each orchard was investigated and analyzed, with the aim of comprehensively understanding the soil

management level of Longxian orchards, and providing reasonable suggestions for the high and high yield of apples. fertilization basis.

## 2. Materials and Methods

In July 2020, soil was collected from 5 orchards in Longxian County. The sampling followed the principle of randomness and mixing. According to the depth of the ploughing layer of the fruit trees, the depth of soil sample collection was set at 0-40cm. The "S"-shaped point distribution method, which is generally used for plots with large applicable areas and uneven terrain, was selected to make mixed soil samples. After the samples are thoroughly mixed, about 1 kg of soil samples are retained by the "quartering method". Two samples were collected from each orchard, for a total of 10 soil samples. Soil nutrients were determined after air-drying and grinding in the laboratory.

The soil nutrient measurement items and methods are shown in Table 1.

**Table 1.** Soil Nutrient Determination Items and Methods

| Measurement items | Detection method |
|---|---|
| pH | pH meter method |
| Total nitrogen | semi-micro Kjeldahl method |
| Organic matter | Potassium dichromate external heating method |
| Available Phosphorus | Molybdenum Antimony Anti-Colorimetry |
| Fast-acting potassium | flame photometry |

## 3. Results and Discussion

### 3.1. pH Analysis

Soil pH affects the availability of various mineral elements. Studies have shown that soil pH can affect the nutrient status of soil by affecting the types and populations of microorganisms in the soil. According to the grading standard of soil pH value in Shaanxi Province, it can be seen that the soil of the five orchards in Longxian is weakly alkaline to alkaline, the pH value varies from 8.50 to 8.74, and the average value is 8.65, and apple trees grow best in slightly acidic to neutral soils. Therefore, soil pH suitable for apple growth can be achieved by improving soil pH and reducing soil pH.

### 3.2. Organic Matter Content Analysis

The average content of soil organic matter was 11.7 g/kg, the maximum was 16.6 g/kg in Zaozunzhai, and the lowest in Wangmazui, which was only 7.87 g/kg, equivalent to 67.3% of the average level. According to the grading standard of cultivated land soil nutrient content in Shaanxi Province (Table 2), the surveyed Longxian County

The soil organic matter content in the five orchards was at the medium level, accounting for 70.0%, and at the low level, accounting for 30.0%. It can be seen that the soil organic matter content of the five orchards in Longxian is generally low, and the deeper the soil layer, the lower the soil organic matter content. The vast majority of orchards lack soil organic matter content, and it is necessary to increase the application of organic fertilizers to improve soil organic matter content.

### 3.3. Nitrogen Content Analysis

The average soil total nitrogen content of the five orchards in Longxian County was 0.84 g/kg, and the overall level was low. The maximum value was Shangzhaizi, where the content reached 0.98 g/kg, which was at a medium level. The lowest value was Puleyuan, where the content was

0.63 g. /kg, at a low level, equivalent to 75.0% of the average level. From this, it can be seen that the soil nitrogen content of the five orchards in Longxian under the investigation is generally low, and attention should be paid to the application of organic fertilizers and nitrogen fertilizers, so as to increase the content of soil organic matter and nitrogen.

### 3.4. Available Phosphorus Content Analysis

The soil available phosphorus content of the five orchards in Longxian County was between 1.2 and 9.2 mg/kg, with an average value of 4.9 mg/kg, the highest value in Zaocunzhai, and the lowest in Puleyuan, equivalent to 67.3% of the average level. It can be seen that the soil of the five orchards in Longxian is at a very low level as a whole, and the application of phosphorus fertilizer should be paid attention to.

### 3.5. Available Potassium Content Analysis

Soil available potassium in 5 orchards in Longxian County The average value is 149 mg/kg, and the variation range is 104-237 mg/kg, with a larger variation range. The content of available potassium in Shangzhaizi, Wangmazui and Zaozunzhai is between 160 and 237 mg/kg. According to the survey, when the available potassium in the soil is less than 150 mg/kg, the content of available potassium is positively correlated with apple yield, while more than 150 mg/kg. The above values are negatively correlated. Therefore, the application of potassium fertilizer should be appropriately reduced in these three places. However, 70.0% of the five orchards in Longxian had a low-level soil available potassium content. Therefore, the amount of potassium fertilizer can be moderately increased in Longxian orchards as a whole to provide necessary elements for the growth of fruit trees.

## 4. Conclusion

In this study, the sampling survey of 10 soil samples from 5 orchards in Longxian County showed that the soils were all weakly alkaline to alkaline, and the soil pH suitable for apple growth should be achieved by improving soil pH and reducing soil pH. Most orchards lack soil organic matter content, and the deeper the soil layer, the lower the soil organic matter content, and it is necessary to increase the application of organic fertilizers to improve the soil organic matter content; the nitrogen content is generally low, and attention should be paid to the application of organic fertilizers and nitrogen fertilizers. Therefore, the content of soil organic matter and nitrogen is increased; the phosphorus content is at a very low level as a whole, and attention should be paid to the application of phosphorus fertilizer; the content of available potassium is at a low level as a whole, so the amount of potassium fertilizer can be moderately increased in Longxian orchards as a whole to provide necessary for the growth of fruit trees. Elements. also, In addition to targeted fertilization according to the nutrient content in the soil, Longxian orchards should also actively adopt methods such as growing grass in orchards and integrating water and fertilizer to improve orchard organic matter, The content of mineral nutrients and water, which in turn affects tree growth and fruit quality, and improves the ecological effect in orchard.

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