

# Investigation on Strawberry Variety Resources and Production in Longkou

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**Keywords:** strawberry; variety survey; total yield; cultivation area;

**Abstract:** In order to reveal the change rule of strawberry production and the characteristics of Strawberry Variety replacement in Longkou City, the cultivation varieties, cultivation area and total yield of strawberry in five townships from 2008 to 2017 were investigated. The results showed that the development regularity of strawberry cultivation area and yield in Longkou City was basically similar, and the overall performance showed a trend of increasing first, then decreasing sharply to rising steadily. The evolution of cultivars is characterized by large-yield cultivars, supplemented by medium and small-yield cultivars. It is concluded that the strawberry industry in Longkou is in the transition period from low-level to high-level, and there will be more room for growth in the future. In the future, only by breeding high yield cultivars, relying on appropriate ecological environment and scientific management techniques, can the quality and yield potential of cultivated cultivars be brought into full play in Longkou City, which is of great significance to promote the sustainable and healthy development of Longkou strawberry industry.

## 1. Introduction

Longkou City has a long history of strawberry cultivation, and its planting area and yield rank first in the province. However, in recent years, the increase of strawberry area and yield has slowed down significantly, even lower than the average level of the province in the same period. Based on this, the author investigates the strawberry cultivars and their production status in five townships of Longkou City from 2008 to 2017, aiming to reveal the trend of strawberry production and the characteristics of Strawberry Variety replacement in Longkou City, and to provide scientific basis and theoretical guidance for strawberry variety protection, variety improvement and efficient production.

## 2. Research methods

### 2.1 Research sites

Longkou City is located in the northeast of Shandong Province. It is located in the east longitude of 120°13'~120°44', north latitude of 37°27'~37°, East Yantai, South Qingdao, North Dalian and Tianjin across the sea, with convenient transportation. Temperate monsoon climate, annual average temperature 11.6°C, climate type is very suitable for Strawberry Growth and development.

The survey site covers 5 townships planting strawberries in Longkou City. (i.e. Xijia Street, Langao Town, Beima Town, High-tech Park, Qijia Town)

### 2.2 Contents of the Survey

This survey is based on field investigation, historical records of Longkou Agricultural Bureau and Longkou Statistical Yearbook compiled by Longkou Statistical Bureau. The main parameters of the survey included strawberry cultivars, cultivation area and total yield in five townships from 2008 to 2017.

### 2.3 Data Analysis

The change trend and evolution process of strawberry yield and area in five townships from 2008

to 2017 were analyzed. Different strawberry cultivars were divided into three types: large yield cultivars (total yield (> 6094 t), medium yield cultivars (total yield 2260-1860 t) and small yield cultivars (total yield 960-170 t).

### 3. Results and analysis

#### 3.1 Trend and Change Characteristics of Strawberry Yield

The total yield of strawberry varies in different towns. The total output of Xinjia Street is larger, followed by Langao Town, Beima Town, High-tech Park and Qijia Town (Fig. 1). From 2008 to 2017, strawberry production in Longkou City was in a period of great fluctuation, which could be roughly divided into three stages. 2008-2010 is the first stage, which belongs to the fastest stage in the industrial development cycle, with total output increasing from 8980t to 1384t; 2011-2014 is the second stage, which belongs to the relatively lagging stage of industrial development, with output falling from 4218t to 4845t; 2015-2017 is the third stage, which belongs to the steady development stage of strawberry industry, with total output rising from 6936t to 9412t.

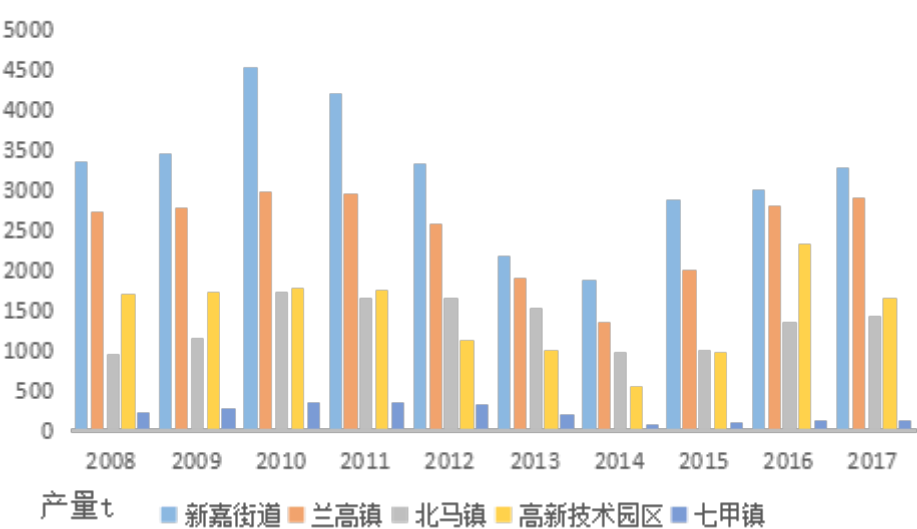


Figure 1 Total Strawberry Yield in Longkou City, 2008-2017

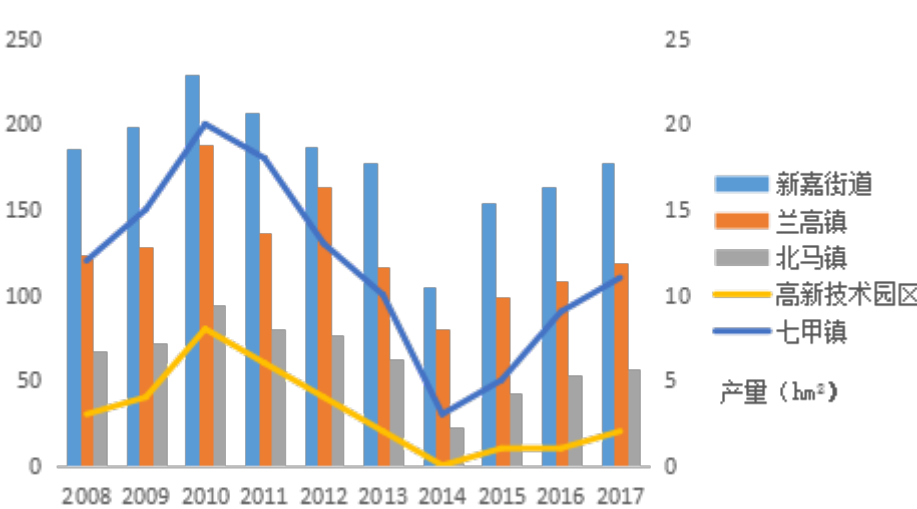


Figure 2 The total area of strawberries in Longkou City from 2008 to 2017

### 3.2 Trend and Change Characteristics of Strawberry Cultivation Area

The cultivation area of strawberries in different towns in Longkou City varied greatly from 2008 to 2017 (Figure 2). The development trend of cultivation area was similar to that of total strawberry yield. There are three key nodes in the overall development cycle, namely, the expansion period, the decline period and the steady rise period. From 2008 to 2010, the cultivated area increased from 391 hm<sup>2</sup> to 539 hm<sup>2</sup>. After 2011, it began to fall sharply, and dropped to 211 hm<sup>2</sup> in 2014. From 2015 to 2017, it began to rise gradually, and to 3671 hm<sup>2</sup> in 2017.

### 3.3 Variation characteristics of strawberry cultivars in Longkou City

According to the investigation of strawberry cultivars in Longkou City from 2008 to 2017, there are abundant strawberry cultivars. Among the three types of strawberry cultivars (large yield, medium yield and small yield), the high yield cultivars are Fengxiang, Baojiao and Sweet Charlie; the middle yield cultivars are Zhangji, Hongyan and Xingxiang; the small yield cultivars are Lihong, All Star and Ruby, Flange and Miaoxiang 7. Among them, the number of varieties was the largest in 2017, 19, and the least in 2014, 8. The planting proportion of large-yielding varieties increased from 67.2% in 2008 to 93.7% in 2017, while that of Medium-yielding varieties decreased from 32.1% in 2008 to 2.7% in 2017, while that of small-yielding varieties increased from 0.7% in 2008 to 3.6% in 2017 (Figure 3).

Longkou strawberry production is mainly concentrated on large-yielding cultivars, that is, large-yielding cultivars have the largest proportion of sown area and yield in the total yield, and their contribution is also the largest. The middle yield and small yield varieties are few, mostly concentrated in the local ecological harvesting garden, leisure farmhouse, green sightseeing garden and so on.

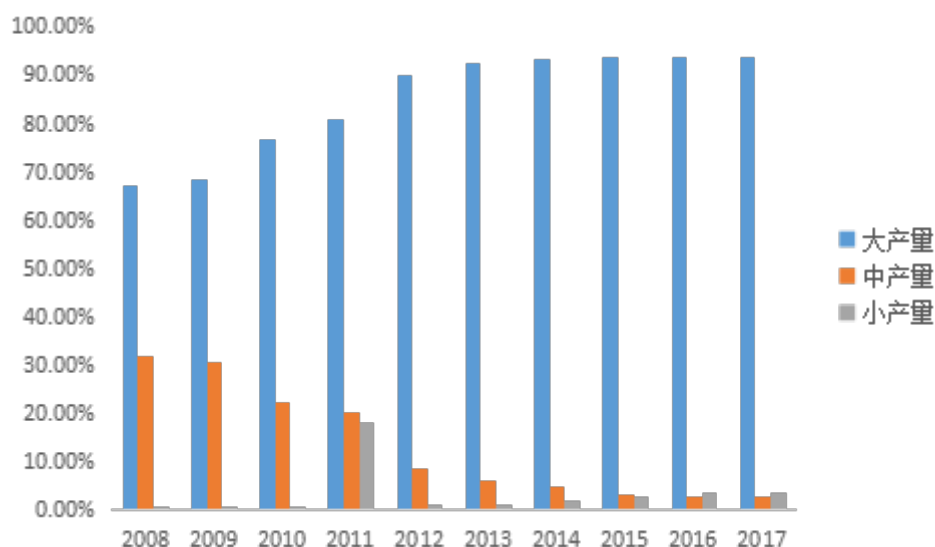


Figure 3 Varieties of Strawberry Cultivation in Longkou City from 2008 to 2017

### 3.4 Succession characteristics of strawberry cultivars in different years

According to the survey, the selection of strawberry varieties in Longkou City from 2008 to 2017 has the succession characteristics of survival of the fittest. In 2008, excellent varieties such as Fengxiang, Baojiao Zaosheng, Zhangji, Hongyan and Xingxiang were introduced; in 2014, Lihong No. 1 and All-Star varieties with poor market response were eliminated, and Sweet Charlie, an effective variety to resist continuous cropping obstacles, was increased; in 2017, with the steady development of local ecological picking gardens, leisure farms and green sightseeing gardens, strawberry varieties developed with the diversification of consumers' needs. The cultivation of strawberry varieties such as milk, Ruby and flange is also increasing.

#### 4. Conclusion and discussion

The development trend of strawberry industry in Longkou City was comprehensively analyzed. From 2008 to 2010, Longkou City carried out the structural adjustment of agricultural industry, increased the proportion of investment in strawberry industry, which directly led to a substantial increase in strawberry planting area and output; from 2011 to 2014, it is still in the period of regional industry transformation from low-level to high-level, and the supporting reform policies have not yet been fully promulgated, coupled with relatively backward production methods and high production costs, which led to the increase of strawberry planting area and output. The economic benefits can not meet the expectations of farmers, resulting in the lowest drop in planting area and output in 2014. Structural reform of agricultural supply side was vigorously promoted from 2015 to 2017. Longkou City has transformed and upgraded the comprehensive utilization of agricultural by-products, production and marketing mode of agricultural products, so that strawberry industry can develop steadily and gradually upward trend.

Although there are many factors to improve the yield and quality of strawberry, such as improvement of planting technology, investment of advanced facilities and effective control of cropping obstacles, the most important thing is to select high-quality and high-yield cultivars [3]. The full development of varieties' quality and yield potential also depends on the appropriate ecological environment and scientific management techniques [4]. Therefore, in order to realize the high quality, high yield and high efficiency production of Longkou strawberry, we not only need to strengthen the improvement of strawberry quality and breeding of high quality varieties, but also need to implement matching management technology according to the characteristics of varieties and local conditions, so as to give full play to the quality and yield potential of cultivated varieties in Longkou City, which is also of great significance to the sustainable and healthy development of Longkou strawberry industry in the future.

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