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On Modern Fruit Production in Japan

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Abstract Japan's fruit tree production technology is in the world leading level. In order to understand Japan's fruit tree production, by through visits to Japan and data collection, this paper analyzes the changes in Japan's fruit tree cultivation area, regional distribution of fruit tree cultivation, main cultivars and market circulation in recent years. The results show that Japan's fruit tree cultivation area underwent great volatility in the 1980s and 1990s and it has been stabilized in recent years; the cultivation area of principal fruit tree is reduced, while the cultivation area of new fruit trees and characteristic fruit tree varieties is increased; the regionalization of fruit tree is obvious and the main cultivars are clear. Japan's principal fruit price goes through slight fluctuations during the year while the price of cherries and peaches goes through great fluctuations. It is concluded that Japan's fruit tree industry is stably developed.

Key words Japan, Fruit, Cultivation area, Cultivars, Circulation

1 Introduction

Japan's fruit tree cultivation technology has been at a leading level in the world. The world's major fruit varieties cultivated at present are mostly from Japan, for example, "Fuji" apple has become the world's main cultivar of apple, accounting for a large proportion; "Kyoho" grape has become popular in the world since the 1970s, and the world's cultivars of grape at present are still "Kyoho" varieties; "Niiitaka", "Kosui" and other varieties of pear have become the major cultivars of pear in Asia. Since the reform and opening up, China's fruit industry has developed by leaps and bounds, but compared with developed countries, the level of cultivation techniques is lower, and the yield or quality is also lower. In order to allow more farmers to understand the fruit tree cultivation in developed countries, we analyze the dynamic situation of Japan's fruit tree cultivation to provide a reference for the development of China's fruit industry.

2 Changes in the fruit tree cultivation area

According to the statistics of the Ministry of Agriculture, Forestry and Fisheries of Japan in 2012^[1], citrus has the largest cultivation area currently, followed by apple, persimmon, chestnut, grape, plum, Japanese pear and peach. The fruit tree cultivation area in Japan experienced large fluctuations from the 1980s to the 1990s, and then became gradually stabilized, as shown in (Fig. 1–3). The cultivation area of kiwi fruit went through the largest fluctuations, soaring from 516 ha in 1980 to 5210 ha in 1990, and then decreased rapidly and stabilized at 2400 ha. The cultivation area of pineapple underwent the sharpest decrease, from 3190 ha in 1980 to 537 ha in 2012, a decrease of 83.2%; the cultivation area of citrus, chestnut, grape, peach, Japanese pear and apple was also greatly reduced, a decrease of 58.2%, 50.0%, 37.4%,

33.9%, 27.6% and 20.9%, respectively. The fruit with a great increase in cultivation area was European pear, from 851 ha in 1980 to 1760 ha in 2012, an increase of 106.8%; there was a large increase in the cultivation area of cherries, from 2780 ha in 1980 to 4880 ha in 2012, an increase of 75.5%. In short, in the past 30 years, the cultivation area of kiwi fruit in Japan experienced great fluctuations; the cultivation area of pineapple, citrus, chestnut, grapes, peaches, Japanese pears and apples was significantly reduced; there was a significant increase in the cultivation area of European pear and cherries. The cultivation area of principal fruits decreased while the cultivation area of new fruits and characteristic fruits increased.

3 Fruit distribution

3.1 The main fruit distribution According to the statistics of the Ministry of Agriculture, Forestry and Fisheries of Japan in 2012^[1], the proportion of Japan's main deciduous fruit trees in various countries can be shown in Table 1. The area producing the largest amount of apples is Aomori County, followed by Nagano County, accounting for 53.6% and 20.2% of apple cultivation area, respectively; the main grape producing areas are Yamanashi County and Nagano County, accounting for 22.4% and 12.8% of grape cultivation area, respectively; the main Japanese pear producing areas are Chiba County and Ibaraki County, accounting for 11.9% and 9.4% of Japanese pear cultivation area, respectively; the main European pear producing areas are Yamagata County and Aomori County, accounting for 58.5% and 8.4% of European pear cultivation area, respectively; the main peach producing areas are Yamanashi County and Fukushima County, accounting for 32.4% and 16.3% of peach cultivation area, respectively; the main plum producing areas are Yamanashi County and Nagano County, accounting for 29.6% and 13.0% of plum cultivation area, respectively; the main cherry producing areas are Yamagata County and Hokkaido, accounting for 65.2% and 11.9% of cherry cultivation area, respectively; Japanese apricot and persimmon are mainly concentrated in Wakayama, accounting for 31.3% and

12.2% of cultivation area, respectively. In terms of the distribution of Japan's fruit trees in different regions, apple is mainly in Aomori while European pear and cherry are concentrated in Yamagata, with the most prominent regional characteristics; the regional characteristics of grape, peach, plum and Japanese apricot are also obvious. In short, Aomori is apple's main producing area;

Yamagata mainly produces European pear and cherry; Wakayama mainly produces Japanese apricot and persimmon; Yamanashi mainly produces grape, peach and plum. There are many kinds of fruit trees cultivated in Nagano, but there is no main variety. Overall, the cultivation of Japan's fruit trees shows prominent regional characteristics.

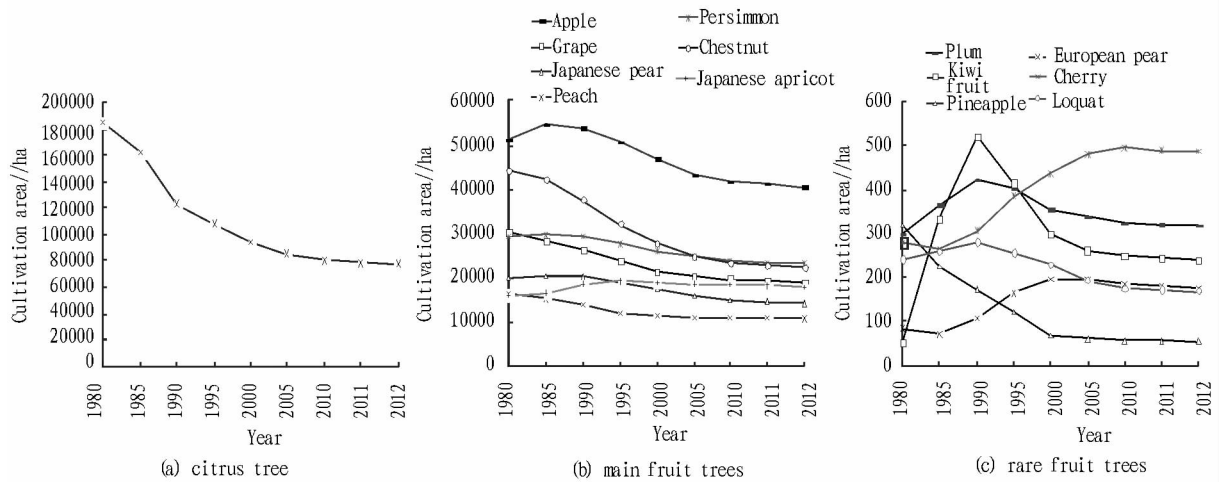


Fig. 1 Change in the cultivation area of fruit trees in Japan over the past 30 years

Table 1 The proportion of Japan's main deciduous fruit trees in various countries

County	Proportion // %								
	Apple	Grape	Japanese pear	European pear	Peach	Plum	Cherry	Japanese apricot	Persimmon
Aomori	53.6	2.4	—	8.4	—	3.3	6.6	—	—
Nagano	20.2	12.8	6.3	7.2	11.0	13.0	2.2	3.4	3.0
Yamagata	4.0	9.2	—	58.5	6.0	7.5	65.2	—	4.5
Fukushima	3.5	—	8.0	2.8	16.3	5.2	1.9	3.0	6.0
Yamanashi	—	22.4	—	—	32.4	29.6	7.5	2.7	—
Hokkaido	1.6	6.2	—	4.8	—	4.2	11.9	—	—
Wakayama	—	—	—	—	7.2	9.7	—	31.3	12.2
Iwate	6.7	2.1	—	4.7	—	—	—	—	—
Akita	4.2	—	—	5.4	—	—	1.8	—	—
Niigata	—	—	3.6	6.0	2.3	—	—	—	3.3
Miyagi	—	—	1.2	—	—	1.2	—	2.7	1.7
Fukuoka	—	5.1	3.5	—	—	3.1	—	2.4	8.8
Chiba	—	—	11.9	—	—	—	—	—	—
Okayama	—	6.5	—	—	6.4	—	—	—	—
Kagawa	—	—	—	—	2.2	—	—	—	—
Aichi	—	2.7	—	—	2.0	—	—	2.3	5.7
Kumamoto	—	—	4.1	—	1.2	—	—	—	—
Ibaraki	—	—	9.4	—	—	—	—	3.1	—
Gunma	1.1	—	—	—	—	—	—	6.2	—
Tochigi	—	—	6.3	—	—	—	—	—	—
Osaka	—	2.5	—	—	—	—	—	—	—
Tottori	—	—	7.8	—	—	—	—	—	—
Saitama	—	—	3.6	—	—	—	—	—	—
Fukui	—	—	—	—	—	—	—	2.8	—
Kanagawa	—	—	—	—	—	—	—	2.6	—
Nara	—	—	—	—	—	—	—	—	8.1
Gifu	—	—	—	—	—	—	—	—	6.2
Ehime	—	—	—	—	—	—	—	—	3.3
Kagoshima	—	—	—	—	—	3.1	—	—	—
Oita	—	—	—	—	—	3.1	—	—	—

3.2 Rare fruit trees The dynamic survey on specialty fruit production in 2012 by the Ministry of Agriculture, Forestry and Fisheries in Miyagi County^[2] shows that in addition to principal

fruit trees, there are also some rare fruit trees to be cultivated in Japan. The rare fruits in Miyagi include grapefruit, fig, ginkgo, blueberry, Amur grape, West Indies cherry, passion fruit and

raspberry. The cultivation area of the first four fruits is more than 10 ha each.

Table 2 The cultivation fruit trees not posted on the statistical table of the Ministry of Agriculture, Forestry and Fisheries of Japan (Miyagi)

Fruit tree type	Cultivation area//ha	Production//t	The main varieties
Grapefruit	11.0	9.6	大果无核,在来种,多田锦
Fig	66.3	102.0	在来种,ホワイトゼノア
Ginkgo	11.9	3.9	藤九郎,久寿
Blueberry	30.1	37.0	アーリーブルー、ブルーレイ、ダロウ
Amur grape	0.1	0.1	选拔系
West Indies cherry	0.3	6.5	酸果系
Passion fruit	0.1	0.4	八丈島 F1
Raspberry	0.3	0.7	サマーフェスティバル、サウスランド

4 The main cultivars

According to the statistics of the Ministry of Agriculture, Forestry and Fisheries of Japan in 2012^[1], the main cultivars of Japan's fruit trees are particularly clear (Table 3). The variety of 70.4% of Japan's apples is "富士"; 37.4% and 30.7% of Japan's pear varieties are "丰水" and "幸水", respectively; 16.7%, 15.2% and 14.7% of grape varieties are "藤稔", "康拜尔" and "巨

峰"; the variety of 68.36% of peaches is "あかつき (拂晓)"; the variety of 66.8% of plums is "ビューティー"; the variety of 75.8% of European pears is "ラ・フランス"; the variety of 56.5% of Japanese apricots is "白加賀"; the variety of 64.4% of persimmons is "甲州百目". Except Japanese pear and grape varieties (dispersed), a main cultivar accounts for more than 50%, and the highest proportion reaches 75.8% (European pear).

Table 3 The main cultivars of fruit trees

Types	Varieties	Proportion %	Types	Varieties	Proportion %	Types	Varieties	Proportion %
Apple	富士	70.4	Grape	藤稔	16.7	Japanese pear	丰水	37.4
	津轻	9.3		康拜尔	15.2		幸水	30.7
	王林	4.6		巨峰	14.7		长十郎	11.6
	乔纳金	4.6		红伊豆	8.1		新高	9.4
	阳光	2.5		ナイフガラ(刀柄)	7.3		あきづき	4.5
	Others	8.6		Others	38.0		Others	6.3
Peach	あかつき(拂晓)	68.6	Plum	ビューティー	66.8	European pear	ラ・フランス	75.8
	川中島白桃	15.4		ソルダム	24.1		ゼネラル・レクラーク	8.3
	白鳳	7.0		大石早生	8.0		ル・レクチエ	6.9
	长泽白鳳	1.5		サンタローザ	0.7		シルバーベル	4.8
	山根白桃	1.1		Others	0.4		Others	4.2
	Others	6.4	Japanese apricot	白加賀	56.5	persimmon	甲州百目	64.4
Cherry	佐藤锦	59.2		竜峡小梅	9.2		平核無	19.6
	紅秀峰	10.9		小梅	8.4		堂上蜂屋	7.2
	正香锦	10.2		莺宿	4.2		会津身不知	4.8
	高砂	7.6		越の梅	4.0		刀根早生	1.8
	拿破仑	5.0		Others	17.6		Others	2.4
	Others	7.1						

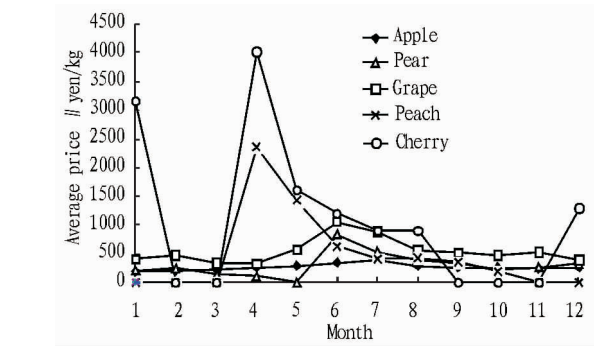


Fig. 2 The change in the prices of main fruits in whole-sale market in Sendai City in 2012

5 Fruit circulation

The change in the prices of fruits in wholesale agricultural product market in Sendai City in 2012 is shown in Fig. 4^[3]. The prices of

cherry underwent the greatest fluctuations in mid – 2002. The price was up to 4031 yen/kg in April, while it dropped to less than 900 yen/kg in July and August. There were also great fluctuations in the prices of peaches. The price was up to 2356 yen/kg in April, while it dropped to 192 yen/kg in October. There was some volatility in the price of other fruits in the off-season, but the price was relatively stable.

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