

原著論文

Exploration and Collection of Wild and Locally Cultivated Peach Genetic Resources in Iwate Prefecture

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Summary

We planned to the exploration of peaches in the Kitakami mountain region in Iwate Prefecture with the dual aims of the exploration of wild plants in limestone area and that of local laces in local farmers' orchards. We discovered a total of 32 wild trees in eight different localities for the exploration of wild plants. We visited eight farmers in five municipalities. We observed and investigated a total of 12 trees, of which 11 bear fruits. All trees have haired (peach type) fruits. The fruit size is much smaller and the harvest season is the same or later than the late-maturing modern cultivars. According to interviews, the usage of fruits are either fresh eating or for processing into pickles. We finally collected scions for propagating as genetic resources from 10 trees.

Key words: fruit tree, peach, local race, naturalization, Iwate, Tōhoku

Introduction

Peach (*Prunus persica* (L.) Batch) is known from the prehistoric times and cultivated from the ancient in Japan. However, it is not true native and estimated to be introduced from the Asian continent in prehistoric times¹⁾. More than a millenary cultivation of this plant raised its escape and naturalization. As a result, peach trees sometimes grow wild, not only in human area but also in mountain area. In Western and Central Japan, wild habitats are often found in limestone or its adjacent area. This phenomenon can be explained with the special floristic condition of the limestone area where escaped species more easily survive than normal soil area because competitiveness of other native plants becomes weak. There are also several limestone areas in the Eastern Japan. Representative examples are Chichibu region in Saitama and Gunma Pref., Kuzū region in Tochigi Pref., Abukuma region in Fukushima Pref. and Kitakami mountain region in Iwate Pref.²⁾. Since we already explored in the last region in 2005 (for *Pyrus* and *Malus*)³⁾ and 2009 (for small fruits species)⁴⁾, we accumulated much know-how about this area for field expedition.

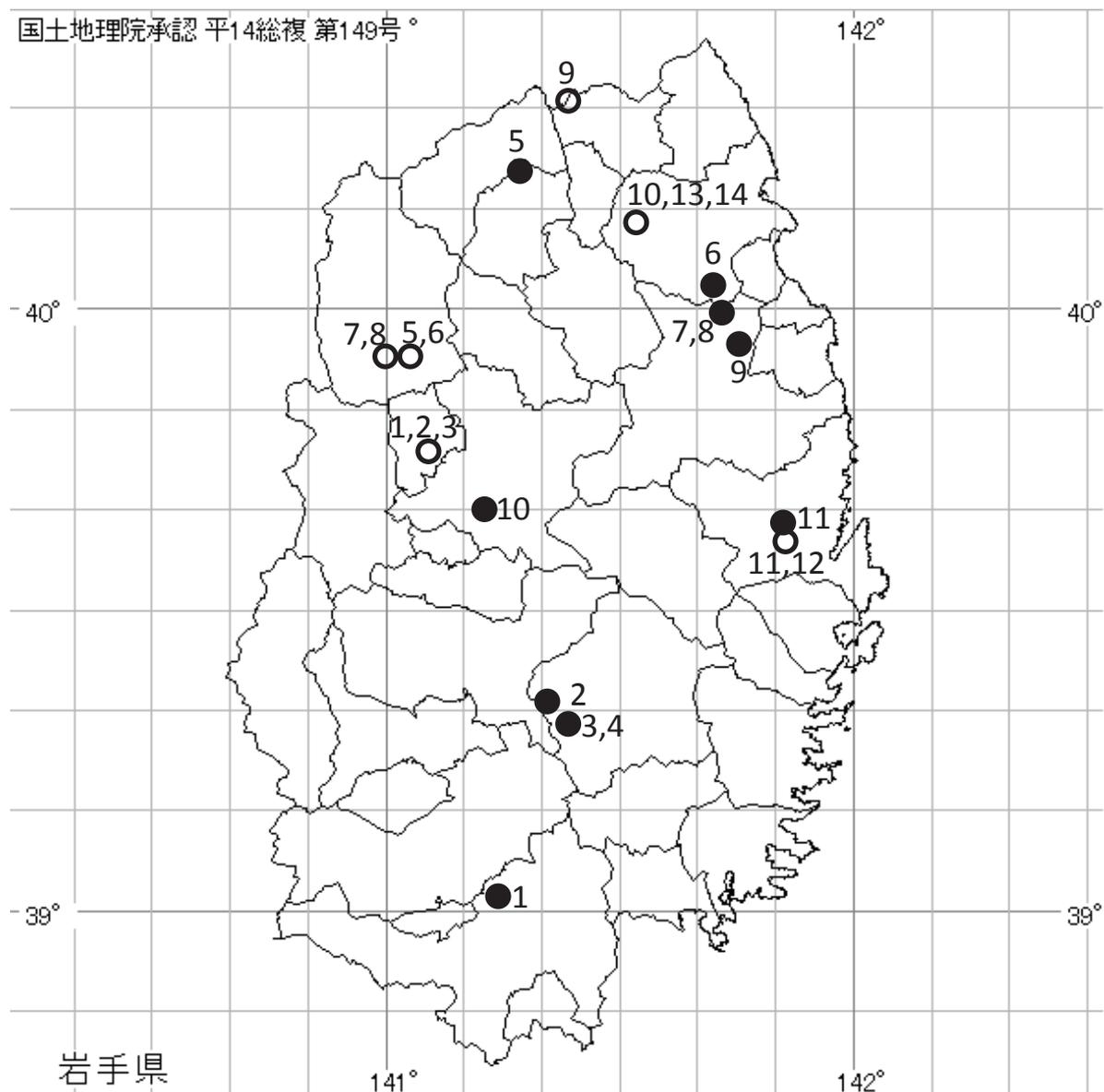


Fig. 1. Investigated sites of genetic resources.

The map was made with KenMap⁸⁾

● : Investigated site of wild tree (No.1-11 in Table 1)

○ : Investigated site of local race (No.1-14 in Table 2)

The other purpose is to discover and collect local races. The cultivation of local races of peaches which differ from modern cultivars, are known in the Northern Tohoku region. One of authors(Haji) already explored them in Aomori Pref. (Haji et al. 2004)⁵⁾. Many peach cultivars had already recognized in the end of the Edo Era (middle of 19th century). However, since large and high-quality cultivars introduced from China and Western countries from that time, previous peach cultivars substituted for latter ones or selected breeds from them^{6),7)}. The wild trees and local races are supposed to be remaining survivors. Therefore we planned to the exploration of peaches in the Kitakami mountain region with the dual aims of the exploration of wild plants in limestone area and that of local laces in local farmer's orchards.

Table 1. List of wild trees of peach investigated in this exploration.

Site number ^{a)}	Municipality	Longitude	Latitude	Habitat	number of discovered individuals	Designation ^{b)}	JP number	Remarks ^{c)}
1	Ichinoseki City	141°14'01"	39°02'34"	River bank	1			
2	Tōno City	141°21'37"-38"	39°21'42"-44"	Limestone rocky slope	4			
3	Tōno City	141°24'47"	39°18'19"	Limestone rocky slope	1			
4	Tōno City	141°24'58"-25'02"	39°18'23"-25"	Limestone rocky slope	4			
5	Ichinohe Town	141°17'59"	40°13'52"	Roadside, in secondary forest	1			
6	Kuji City	141°42'03"	40°02'46"	Abandoned agricultural field?, limestone soil	3			
7	Iwaizumi Town	141°43'37"	39°59'14"	Roadside, limestone soil	3			
8	Iwaizumi Town	141°43'24"-25"	39°59'14"-15"	Limestone rocky slope	10			
9	Iwaizumi Town	141°45'24"	39°56'59"	Roadside, Limestone soil	1	COL/IWATE /2010/NIAS /010	240404	
10	Morioka City	141°12'35"	39°40'31"	Roadside, in secondary forest	1			Tree No.4
11	Miyako City	141°51'53"	39°37'55"	Limestone rocky slope	4			

a) Numbers correspond to those in Fig.1.

b) Designation using in the NIAS Genebank.

c) Numbering on the second field investigation.

Methods

The first field investigation was carried out from 13 to 15 May 2010 by Iketani in order to discover wild peach trees in the flowering time, when these trees are easiest to be found. The second field investigation was conducted by all four authors from 14 to 17 September 2010. At this time we mainly visited farmers' orchards where local races of peach were cultivated, and observed and investigated trees and fruits as well as interviews with the farmers. Finally we went to their orchards again for collecting scions in November 2010 by Iketani, December 2010 by Haji and April 2011 by Haji.

Results and Discussion

1) Wild trees

A total of 32 wild trees were found in eight different localities (Table 1, Fig. 1). Except for three localities (Locality Nos. 1, 5 and 10 in Table 1), they were grown in limestone area. Especially, relatively many trees were found at a locality in Iwaizumi town (No.8). These wild trees generally grow in rocky slope, river bank, etc., where artificial cultivation is unimaginable. However, given that intense and exhaustive cultivation had been performed even in the mountainous zone up to about 50 years ago, artificial planting, or at least, artificial protection of wild seedlings of peach tree cannot be totally denied.

2) Local races

We visited eight farmers' orchards in five municipalities. We observed and investigated a total of 11 trees and their fruits (Table 2). These trees were planted either in backyard garden or at a corner of fruit tree orchards like apple, plum or peach. According to interviews with

Table 2. List of local races of peach investigated in this exploration.

Tree No. ^{a)}	Locality	Owner	Name ^{b)}	Origin ^{b)}	Harvest season ^{b)}	Hair type	Fruit size	Designation ^{c)}	JP number
1	Takizawa Aza Tokusagawa, Takizawa Village	A	Jimomo	rootstock	end of September	peach	20-30 g		
2	Takizawa Aza Tokusagawa, Takizawa Village	A	Jimomo	rootstock	middle to end of September	peach	ca. 30 g		
3	Takizawa Aza Tokusagawa, Takizawa Village	B	Jimomo, Yamamomo	rootstock	end of September	peach	70-100 g	COL/IWATE/2010/NIAS/001	240395
5	Dendō, Hachimantai City	C	Akimomo, Yamamomo, Hagikarimomo	grafted	beginning to middle of September	peach	ca. 40 g	COL/IWATE/2010/NIAS/002	240396
6	Dendō, Hachimantai City	C	Akimomo	grafted	end of September	peach	ca. 30 g	COL/IWATE/2010/NIAS/003	240397
7	Matsuoyoriki, Hachimantai City	D	Momo	rootstock	middle of September	peach	40-50 g	COL/IWATE/2010/NIAS/004	240398
8	Matsuoyoriki, Hachimantai City	E	Yamamomo	uncertain	end of September to beginning of October	peach	20-30 g	COL/IWATE/2010/NIAS/005	240399
9	Kōke, Karumai Town	F	Yamamomo	rootstock	end of September	peach	30-45 g		
13	Yamagatachō- Kawai, Kuji City	G	Bonmomo	uncertain	- d)	- d)	- d)	COL/IWATE/2010/NIAS/006	240400
10	Yamagatachō- Kawai, Kuji City	G	Momo	seedling	end of September	peach	30-50 g	COL/IWATE/2010/NIAS/007	240401
14 ^{e)}	Yamagatachō- Kawai, Kuji City	G	Kenashimomo	uncertain	- d)	nectarine ^{c)}	- d)	COL/IWATE/2010/NIAS/008	240402
11	Rōki, Miyako City	H	Momo	seedling	uncertain	peach	ca. 30 g		
12	Rōki, Miyako City	H	Momo	seedling	beginning to middle of September	peach	90-120 g	COL/IWATE/2010/NIAS/009	240403

a) Based on the numbering on the second field investigation except for 13 and 14. Those numbers correspond to those in Fig.1.

b) Based on interviews with owners

c) Designation using in the NIAS Genebank

d) Data were absent (without fruit)

e) Collected previously (see text)

owners, some trees had originally been planted for rootstocks of scion cultivars, but owners continued to use the fruits of rootstock tree which grew up after the death of scions. Fruit size is generally small, 30 to 50 g, with two exceptional trees which are 70 to 120 g in largest. The harvest season is from September to October. This period is the same or later than the late-maturing modern commercial cultivars. Unlike our previous exploration of Aomori Pref. in 20035), we could not find any trees with nectarine type (hairless) fruit. According to interviews, the usage of fruits are either fresh eating or processing into pickles, or occasionally, jam and preserves in syrup. Some owners sell fruits at local farmers markets and neighboring customers buy them for making pickles. This indicates that local food culture remains and has been shared by local peoples in these areas, not only by farmers.

3) Germplasm collection

We visited again owners of orchards in winter and collected scions for propagating as genetic resources. Unfortunately some trees could not be collected by cutting of owners. This might suggest that the cultivation of these land races were not so important by owners. As a result we collected one wild tree and eight land races (Tables 1,2). In addition another one tree was collected by one of authors (Haji) in 2007 (Table 2, No.14). But we could not observe the original tree already dead in 2010. According to interview with the owner, it was nectarine type unlike all other trees that we observed.

Future prospects

Collected germplasms in this exploration are very important in terms of genetic resources because old cultivars are not only obsolete in agriculture but also extinct as genetic resource collection. Kikuchi⁶⁾ hypothesized that Japanese old cultivars are genetically different from newly introduced cultivars. Added to this, whether local races and wild trees are remaining survivors of old cultivars is also no more than hypothesis. Thus we plan to perform comparative population genetic analyses of these wild and local races in comparison with modern cultivars and other materials for testing these hypotheses.

Kikuchi⁶⁾ also stated that the extinction of old cultivars are due to the inferiority of quality and size as compared with introduced cultivars. However, their extinction before the beginning of modern agronomy prevented them from being evaluated their other agricultural properties e.g., resistibility to diseases and pests, etc. If wild and local races prove to be genetically distinct from modern cultivars, their hidden agricultural properties will also have to be surveyed.

Some of our collections were used rootstocks of modern scion cultivars already. Determination of their possibility of modern cultivar origin could also be resolved by comparative population genetic analysis.

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和文摘要

岩手県北上山地において、石灰岩地の野生化モモ及び農家に伝わる在来系統のモモの探索調査を行った。野生化モモの調査では、8箇所計32個体の野生化モモを見いだした。在来系統のモモの調査では、5つの市町村で8軒の農家を訪問して12個体の調査を行い、うち11個体では果実も調査した。これらの果実は全て有毛であり、近代品種と比べると果実は小さく、成熟期は晩生に相当した。農家での聞き取り調査によると、これらのモモの利用は生食か漬け物用であった。冬期に再度現地を訪れ、野生個体1個体及び在来系統8個体から穂木を採取した。この他に2007年に採取した1個体を合わせて、計10個体の遺伝資源を収集した。



Photo 1. A wild peach tree growing at riverbank, Ichinoseki City (Table 1, No.1)



Photo 2. Wild peach trees growing at a limestone rocky slope, Iwaizumi Town (Table 1, No.8)



Photo 3. A local race of peach growing in an orchard, Takizawa Village (Table 2, No.2)



Photo 4. A local race of peach growing in an orchard, Hachimantai City (Table 2, No.7)



Photo 5. A local race of peach growing in an orchard, Hachimantai City (Table 2, No.8)



Photo 6. Making pickles from peach fruits, Hachimantai City (Table 2, No. 5,6)