

## SOME NOTES ON THE JAPANESE QUINCE

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In connection with a study being made at the Illinois Agricultural Experiment Station of woody shrubs planted chiefly for the interest and beauty of their bloom, (Fig. I) but which are also of potential value for the edible qualities of their first fruit, some attention has been given to the *Chaenomeles* species, formerly included in *Cydonia*, and commonly known as the Japanese Quince. These are ornamental plants usually grown for their handsome, brightly colored flowers which appear early in the spring. Under some conditions the flowers are followed by fruits which vary in size and shape according to the species, usually yellow in color when mature, often fragrant and in some species of considerable culinary value.

In the summer of 1922 the Arnold Arboretum was visited and arrangements made whereby their cooperation was secured in a study of the fruit and plant characters of the collection of *Chaenomeles* species there, probably the largest extant. Grateful acknowledgment is hereby made for this cooperation.

Brief notes have been published from time to time with reference to the possible culinary value of the fruit in addition to its generally recognized value as an ornamental shrub (1 and 2). It was thought advisable, however, at this time to present a somewhat fuller, though incomplete report of the progress of the investigation carried on up to date, based upon the use of material both at the Arboretum and on the Illinois Station grounds. In Table I are listed outstanding plant and fruit characters of the *Chaenomeles* so far studied.

While ornamental shrubs are usually chosen for some particular plant character, such as vigor of growth, beauty of bloom, and size of individual flowers, it was found that several Japanese Quince varieties under observation were very desirable from the standpoint of the fruit produced as well. In such cases the fact was noted under remarks in Table I.

Some of the fruits are about as large as the common European market quince. They are five celled with many seeds in each cell; the shape varies from ovoid to round. They are borne on wood two or more years old, usually singly, sometimes in two's, often with a stem so short that the fruit at the stem end



FIG. 1.—Japanese Quince (*Chaenomeles japonica*) blossoms.

has the appearance of having partially surrounded the branch. The character of the skin surface was found to vary, as will be noted in Table I, from dry and smooth to waxy and very sticky. Where the skin was dotted the dots were more conspicuous on the side of the fruit exposed to the sun. Storage tests showed that the fruit would hold up very well in cold storage, all the varieties listed keeping in good condition for five months or more

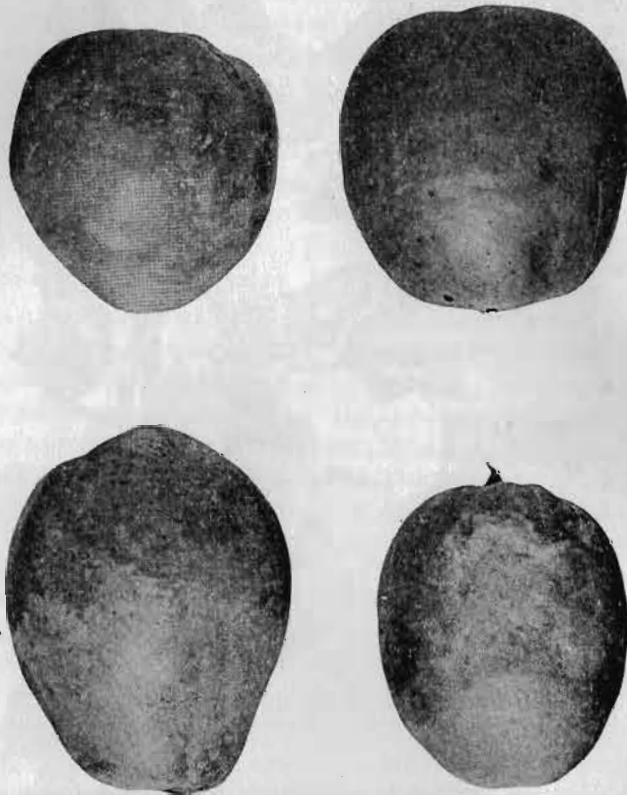


FIG. 2.—Fruits of representative Japanese Quinces. From left to right: top row, *Chaenomeles superba atrosanguinea*, *C. lagenaria fructu alba*; bottom row, *C. lagenaria versicolor*, *C. lagenaria grandiflora*. (One-half natural size.)

at a temperature of 32 degrees F. The skin has a very pleasant odor, even filling a room with fragrance where a dish of quinces is kept for a short while.

While the fruits are very hard, even when mature, it has been known to a few that they contain considerable quantities of pectin and fruit acids and salts which make them a valuable

addition to our present list of fruits available in the canning and preserving industry. The fruit (Fig. 2) of the following varieties is especially adapted to supply the needed pectin and acidulant in making aromatic jellies and conserves with apples and European quinces:

*Chaenomeles lagenaria Baltzii*  
*Chaenomeles lagenaria versicolor*  
*Chaenomeles lagenaria columbia*  
*Chaenomeles lagenaria semperflorens*  
*Chaenomeles lagenaria grandiflora*  
*Chaenomeles lagenaria nivalis*  
*Chaenomeles lagenaria fructu alba*  
*Chaenomeles superba atrosanguinea.*

It has been learned only recently (3 and 4) that the Japanese Quince is the best commercial source of a valuable fruit acid, available without sacrificing its pectin and therefore its jelly making qualities. These investigators found that the fruit has a very high levo-malic acid content, (4.0 to 5.75 percent). Other valuable characteristics are its low sugar content, light color, and absence of citric acid. The acid present is 100 percent malic. The fact that the fruit tissues contain no starch (unlike the European Quince) makes possible the direct use of its juice with other fruits in preserving, without introducing the characteristic cloudy appearance found when the European quince is used.

The fruit has little, if any, flavor, and therefore should not be used alone. Because of its high levo-malic acid content, however, the juice can be used to advantage with fruits like the cherry, plum, quince, apricot and apple where the acid content is mainly levo-malic, but does not furnish in itself sufficient acidity to bring out all the individual fruit flavor which is present.

The Japanese Quince is a native of China and Japan, and, though introduced into this country years ago, it has not been greatly in demand nor featured as especially desirable by nurserymen. Its lack of popularity may have been partly due to its susceptibility to San Jose Scale, formerly considered one of the worst insect enemies of fruit trees and shrubs. With the recent advances in control measures since the introduction of oil sprays it has been found possible to combat the scale effectively. Again it has been the common practice to set out but one variety of the Japanese Quince where used for ornamental purposes and

due probably to self-sterility little or no fruit sets. Few people, therefore, know of its possibilities as a fruiting plant.

Although the species is generally considered self-sterile, preliminary experiments begun this season at Illinois indicate that with some varieties at least such is not the case. It was found for example that *Chaenomeles lagenaria grandiflora* was self-fertile, in that flowers protected by bagging from cross-pollination set fruit.\* Flowers bagged on *Chaenomeles superba atrosanguinea*, *Chaenomeles lagenaria Simonii*, and *Chaenomeles japonica* resulted in no fruit, although an abundance of pollen was noticed adhering to the pistils at the time the latter were receptive. It was interesting, however, to note that excepting in the case of *Chaenomeles lagenaria grandiflora* no fruit was set outside the bags, though bloom was abundant. Minimum temperatures varying from 28 to 32 degrees Fahrenheit occurred during the blooming period of the quince this season and that fact may account for the poor set, whether or not cross pollination occurred.

Although the varieties of the Japanese Quince most promising for fruit are not as yet available generally through the nursery trade, the Illinois Station has for some years acted in cooperation with the Illinois Nurserymen's Association in advising their planting. It is hoped that a supply of some of the best varieties will soon be available. In the near future it is probable that even better varieties may be found by breeding and selection. This is being attempted at the Illinois Station. In the meantime with more demand and common use it will be desirable that the most valuable varieties be given common names easier to use. It is suggested for example that *Chaenomeles lagenaria Baltzii* be known as the Baltz variety, and *Chaenomeles lagenaria columbia* be called Columbia.

### References.

1. Colby, A. S. Collect Ornamental Shrubs that Furnish Food. Illinois Agr. Exp. Sta. Ann. Rept. 1923-24, p. 143.
2. Colby, A. S. Ornamental Shrubs Bearing Edible Fruit. Trans. Ill. State Hort. Soc. 61, p. 369, 1927.
3. Lathrop, C. P., and W. Lowe Walde. The Japanese Quince. The Fruit Products Journal and American Vinegar Industry. Dec., 1927.
4. Lathrop, C. P. The Japanese Quince Promises a Profit to Commercial Growers. American Fruit Growers Magazine, 48:4, p. 8, 39. 1928.

\*The seeds were, for the most part abortive. [A. S. C. Dec. 27, 1928.]



TABLE I.  
SOME CHARACTERS OF CHAENOMELES.

Species	Variety	Flower		Bush		Branches		Fruit *				Remarks
		Color	Single or double	Height in feet	Spread in feet	Spines present or absent	Size in c. m. largest fruits	Shape	Color	Fragrance	Skin	
<i>lagenaria</i>	<i>folius rubis</i>	light cardinal	S	3	5	A	4.1 x 3.5	roundish sides unequal	yellow	medium	dry; dots conspicuous, small, brown, areolar	
"	<i>atrococeinea plena</i>	cardinal	D	5	9	P	3.5 x 2.8	round	yellowish green	heavy	slightly waxy; dots pitted or areolar	
"	<i>nivalis</i>	white	S	7	9	very few	4.9 x 4.4	oblong to roundish	yellow	medium	sticky, sl. waxy, dots conspicuous	desirable
"	<i>Simoni</i>	dark crimson	semi-double	5	7	P	3 x 2.8	obovate	greenish yellow	medium	dull, sl. waxy; dots conspicuous, areolar	
"	<i>Baltzell</i>	rosy pink	S	6	6	very few	4.8 x 5.3	oblong	greenish yellow faint bluish	heavy	smooth, waxy; dots conspicuous	very desirable
"	<i>fructu alba</i>	white	S	3	4	few	4.6 x 4.9	oblong, sides unequal	golden yellow	heavy	sticky to waxy; dots inconspicuous	desirable

\* It was necessary to pick some varieties before maturity for study. Variations in size, color and fragrance are possible under such conditions.

TABLE I.  
SOME CHARACTERS OF CHAENOMELES—Continued.

Species	Variety	Flower		Bush		Branches		Fruit *				Remarks
		Color	Single or double	Height in feet	Spread in feet	Spines present or absent	Size in c. m. largest fruits	Shape	Color	Fragrance	Skin	
lagenaria	cardinalis	cardinal	D large	6	6	P	3.8 x 3.8	ovate	yellowish green	medium	dull pitted; dots conspicuous and areolar, many	
"	grandiflora	creamy pink	S large	6	9	P	4.8 x 5.0	ovate-oblong	yellowish green	medium	waxy; dots small, many	desirable
superba	atrosanguinea	deep red	S.	3	6	P	4.3 x 5.1	ovate-pyriform	golden yellow	heavy	very sticky and waxy; dots small, areolar	very desirable
"		orange red	S.	2	5	P	3.1 x 3.3	oblate to oblong some slightly pyriform	golden yellow light carmine bluish	medium	dull, waxy; dots large	plant tender to winter cold
japonica		red	S	3	5	P	4 x 3.7	round	yellow with brown tinge	medium	rough, dots areolar, conspicuous	commonly grown
"	alpha	red orange	S	3	4	A	3.5 x 4.4	ovate-pyriform	yellow bluish	heavy	rough, sticky; dots inconspicuous and few, areolar	desirable

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"	grandiflora perfecta	creamy pink	S	5	5	P	2.6 x 2.5	ovate	yellowish green with red blush	heavy	very waxy; dots small, areolar, many
agenaria		cardinal	S	5	9	P	4.9 x 4.7	oblate ribbed	greenish yellow brown blotches	medium	smooth; dots conspicuous, areolar
"	versicolor	pink	S	6	9	A	4.7 x 5.7	oblong-pyriform	greenish yellow	medium	smooth, waxy; dots small areolar
"	kermesina semiplena	rose	semi-double	6	7	P	2.6 x 5.4	oblong-ovovate	yellowish green	medium	dull, rough; dots, many conspicuous; areolar
"	moerloosii	rose	S	6	7	few	4.8 x 5.6	oblong slightly pyriform	yellowish green carmine blush	medium	smooth sl. sticky, dots conspicuous

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<i>lagenaria</i>	<i>sanguinea semiplena</i>	cardinal	S	5	5	few	1.6 x 1.4	oblate	green	slight	smooth; dots conspicuous, reddish brown sl. areolar
"	<i>grandiflora semiplena</i>	rose	semi double	5	6	P	4.8 x 4.1	oblate sl. ribbed	greenish yellow	slight to medium	waxy; dots small, many, areolar, conspicuous
"	<i>rosea grandiflora</i>	rose	S	7	12	A	4.4 x 4.5	globular	yellowish green	medium	rough; dots few, conspicuous
"	<i>columbia</i>	rose	S	5	5	P	4.5 x 4.7	oblong sides unequal	golden yellow	medium	sticky, waxy; dots inconspicuous, areolar
"	<i>sempervirens</i>	rose	S	5	6	few	4.8 x 4.8	oblong	golden yellow	heavy	waxy, sticky; dots inconspicuous

\* It was necessary to pick some varieties before maturity for study. Variations in size, color and fragrance are possible under such conditions.

TABLE I.  
SOME CHARACTERS OF CHAENOMELES.—*Concluded.*

Species	Variety	Flower		Bush		Branches	Fruit.					Remarks
		Color	Single or double	Height	Spread in feet		Spines present or absent	Size in c. m. largest fruits	Shape	Color	Frangrance	
	macrocarpa	light cardinal	S	7	8	A	4.5 x 3.0	oblate	yellowish green	slight	dull; dots very large, scattered, areolar	flesh dry
"	marmorata	rose	S	5	7	very few	5.4 x 4.8	obovate sl. pyriform	greenish yellow carmine bluish	medium	smooth, sl. waxy; dots many, conspicuous	
"	rosea plena	rose	D	4	4	very few	3.7 x 2.5	ovate ribbed	yellowish green	medium	dull, sticky, sl. waxy	