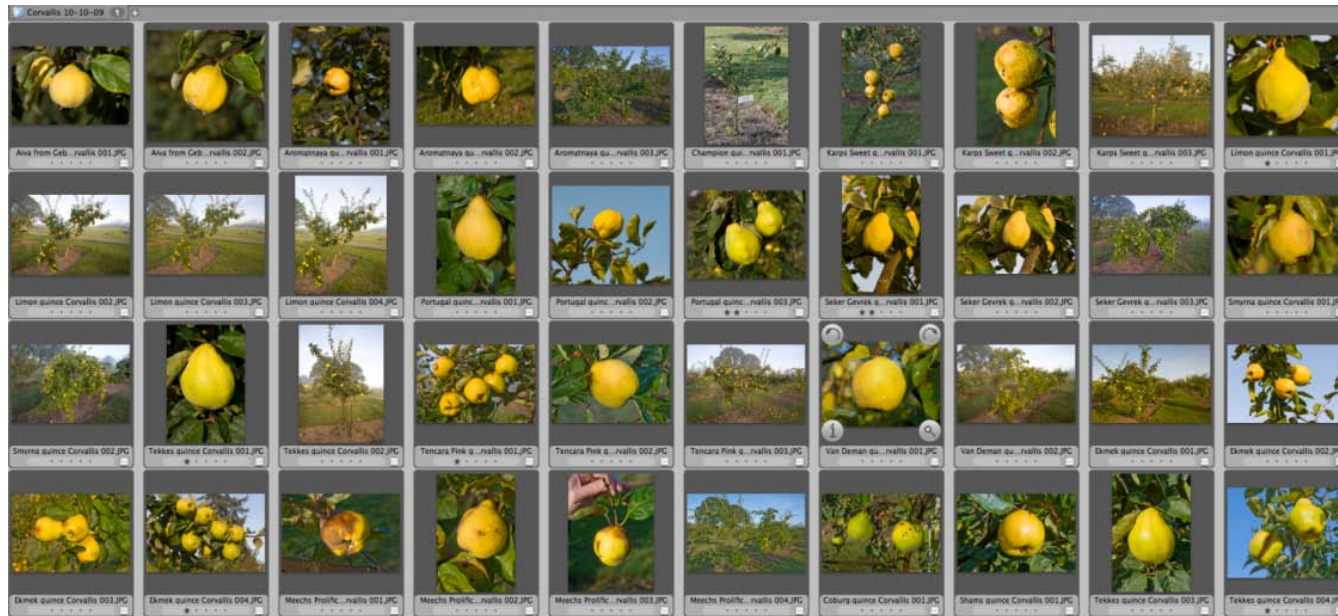


Quince (*Cydonia oblonga*)

Genetic Resources

DNA Fingerprints

Favorite Varieties



Joseph Postman

USDA-ARS National Clonal Germplasm Repository, Corvallis, Oregon

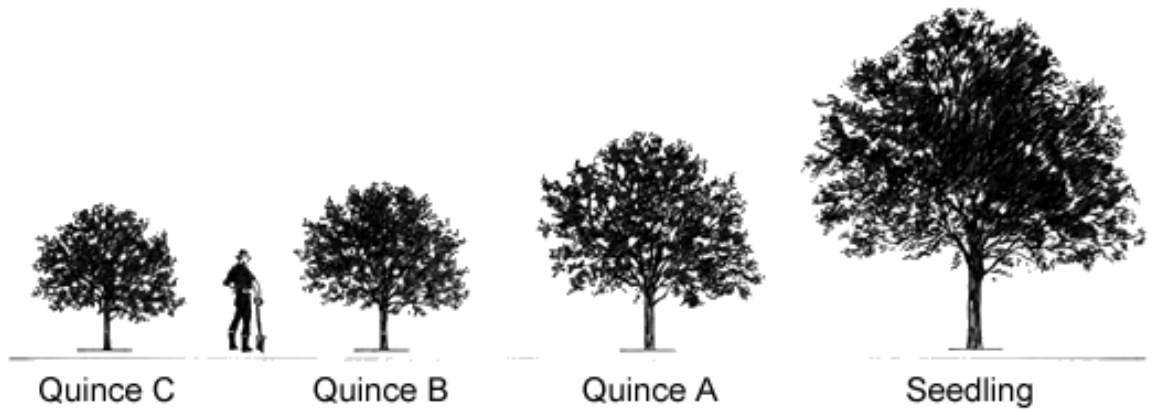
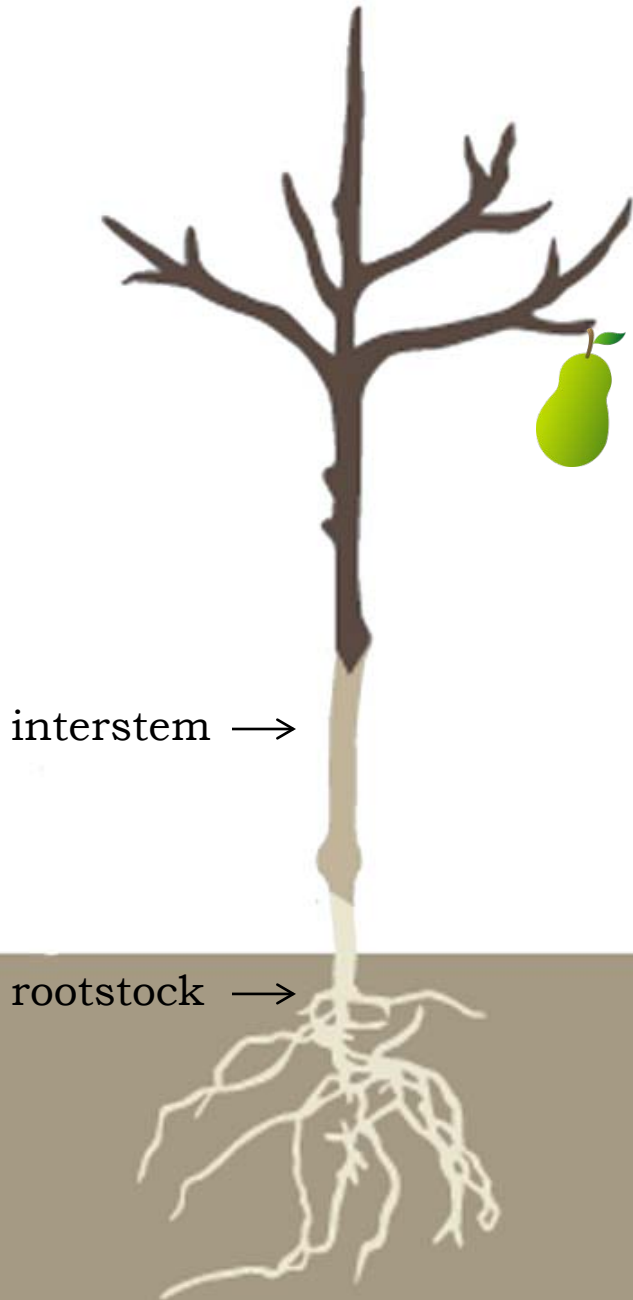
USDA *Cydonia* Germplasm Collection

**Living collection
preserved as growing
trees in NCGR orchard at
Corvallis, Oregon, USA**



Country	Accessions
Albania	2
Armenia	11
Bulgaria	10
France	7
Georgia	10
Germany	2
Poland	6
Russian Federation	16
Turkey	8
Turkmenistan	15
Ukraine	4
Uncertain	16
United Kingdom	15
United States	38
Uzbekistan	1
Total	161

Quince Uses: Rootstock



Quince Uses: Fruit





dulce de membrillo
(quince paste)
jam, candy







**They dined on mince and slices of quince,
Which they ate with a runcible spoon;
And hand in hand on the edge of the sand
They danced by the light of the moon.**

"The Owl and the Pussycat," by Edward Lear

Cydonia Germplasm Collection

Cydonia

- 160 Clonal Tree Accessions:
 - 78 fruit clones
 - 22 rootstock clones
 - 4 wild type
- 23 Seed Accessions

Pseudocydonia

- 7 Tree Accessions
- 1 Seed Accession

Chaenomeles

- 13 Tree Accessions
- 2 Seed Accessions



Caucasus: Homeland of Cydonia



← Corvallis 44.6°

Conservation International
Caucasus Hotspot

Data:
Conservation International
Digital Chart of the World

Wild Quince in NE Georgia



Garden Quince in Shilda Village, Northern Georgia





Armenia

**Dr. Vagharshak
Hayrapetyan in Yerevan
with 'Chartar Gyugh' a local
winter quince.**

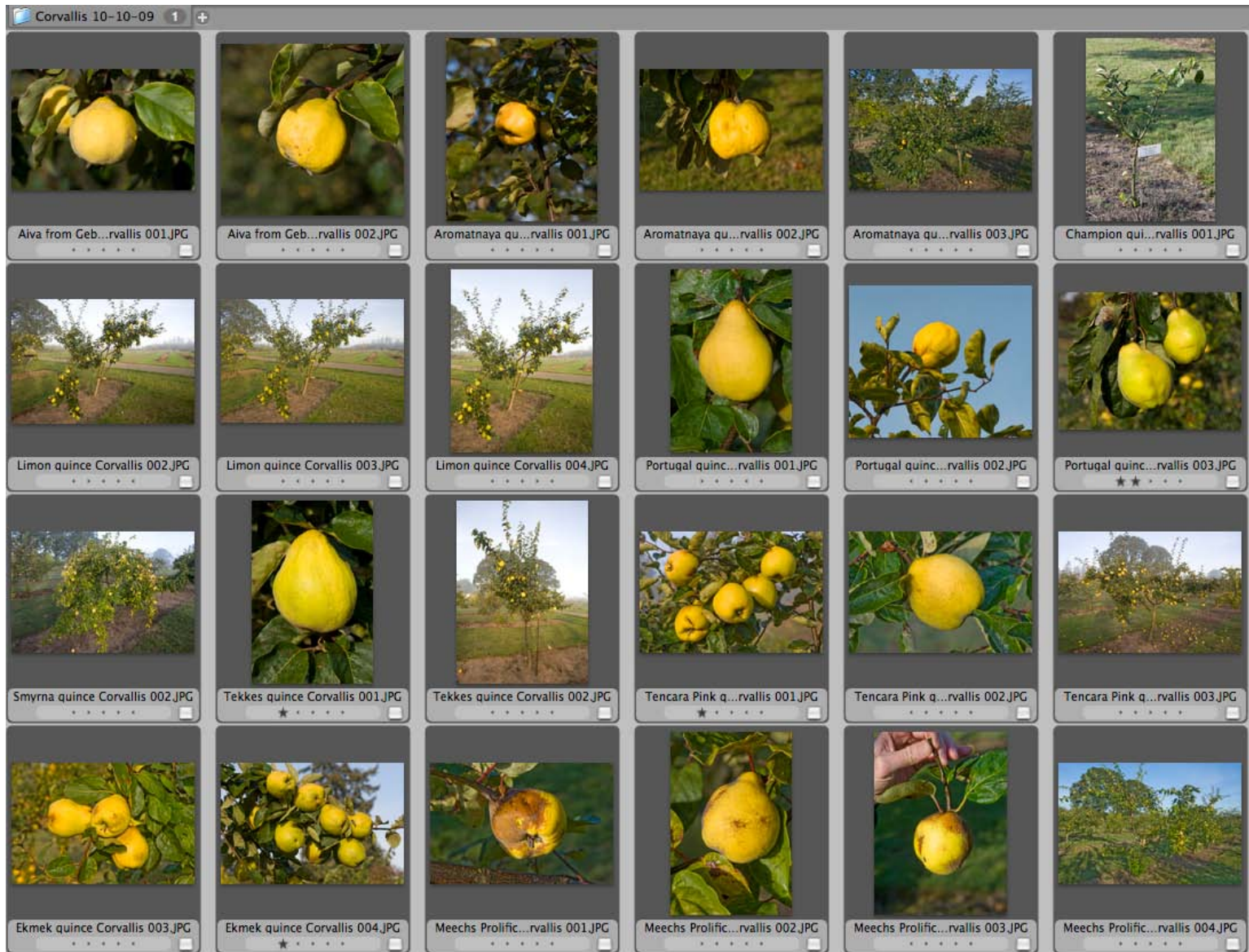
**'Ttvash Serkevil'
(sour quince) from
Shvanaidzor Village in
southern Armenia.**



Quince in Albania 2011



Quince Diversity



DNA Fingerprinting

- **Used nine apple-derived simple sequence repeat (SSR) primer pairs**
- **Determined genetic relationships in 102 European quinces (Cydonia) and 4 Chinese quinces (Pseudocydonia)**
- **Unable to differentiate several groups of genotypes.**



SSR Primers

Marker	Allele No	GeneDiversity	Heterozygosity	PIC	PD
CH03d01pig	8	0.67	0.97	0.61	0.57
CH04e03pig	6	0.72	0.72	0.67	0.83
GD147pig	4	0.42	0.47	0.34	0.57
CH01f02pig	4	0.43	0.36	0.39	0.62
CH01h10pig	3	0.52	0.59	0.44	0.66
CH03d02 D4p	13	0.88	0.97	0.86	0.91
CH04e05pig	9	0.74	0.78	0.70	0.85
CH05a04(A-)	5	0.66	0.50	0.60	0.79
NZ02b1(A-)	11	0.82	0.61	0.80	0.91
Mean-2014	7	0.65	0.66	0.60	
Mean-2009	4.44	0.44	0.44	0.4	

PD= Power of Discrimination

PIC = Polymorphism Information Content

Gene Diversity: Probability that 2 randomly chosen alleles from the population are different



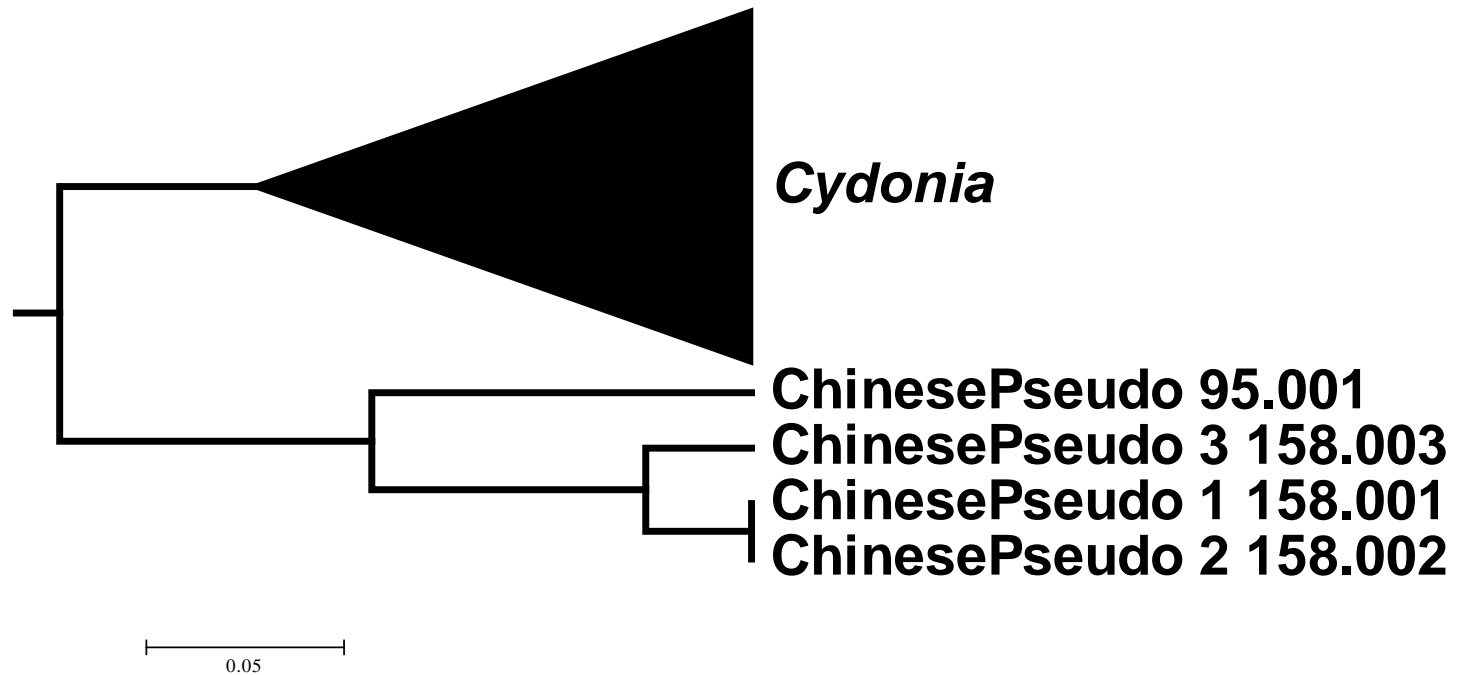
markers also used in 2009 quince study



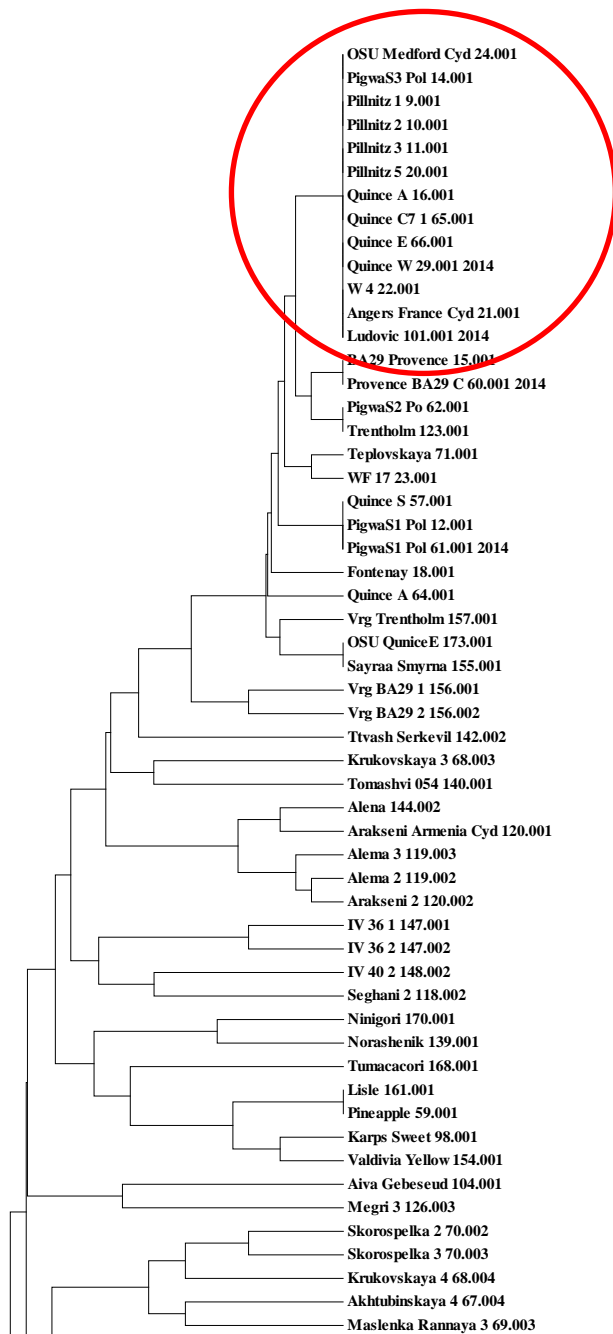
new markers with much higher power of discrimination

Cluster analysis using UPGMA algorithm

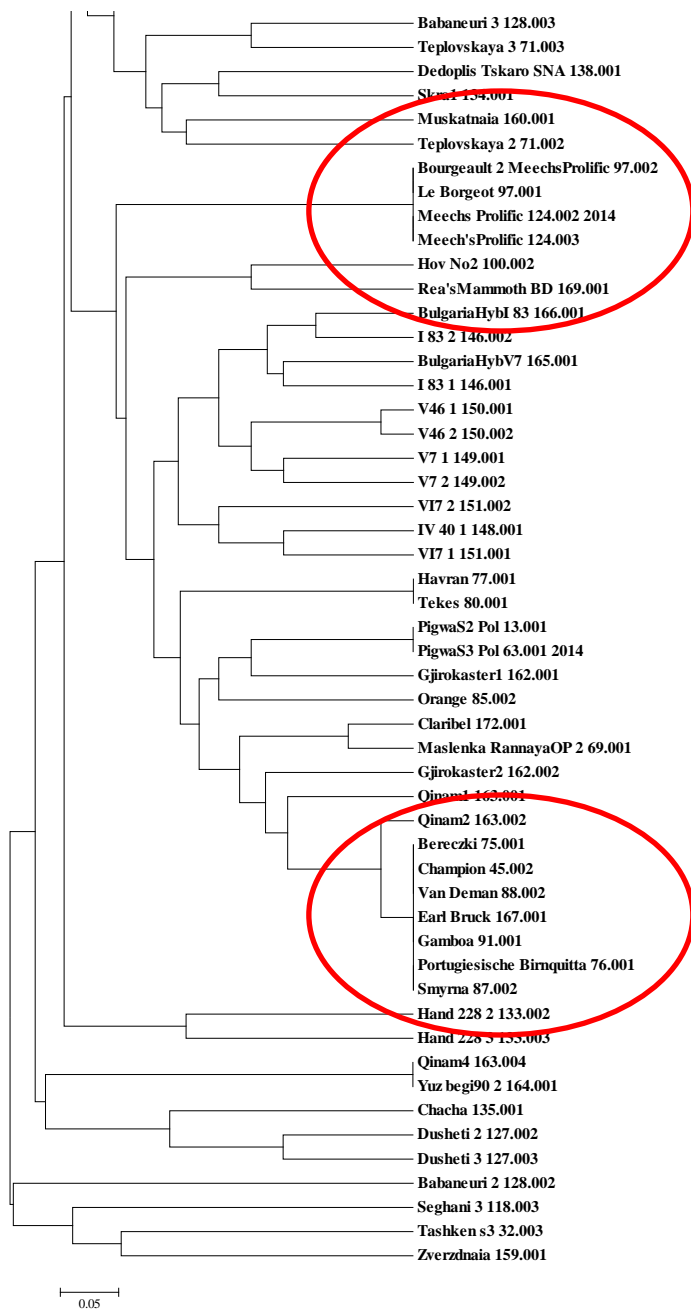
102 accessions using co-dominant scoring



UPGMA Cluster Analysis



**Quince A
Group (12)**

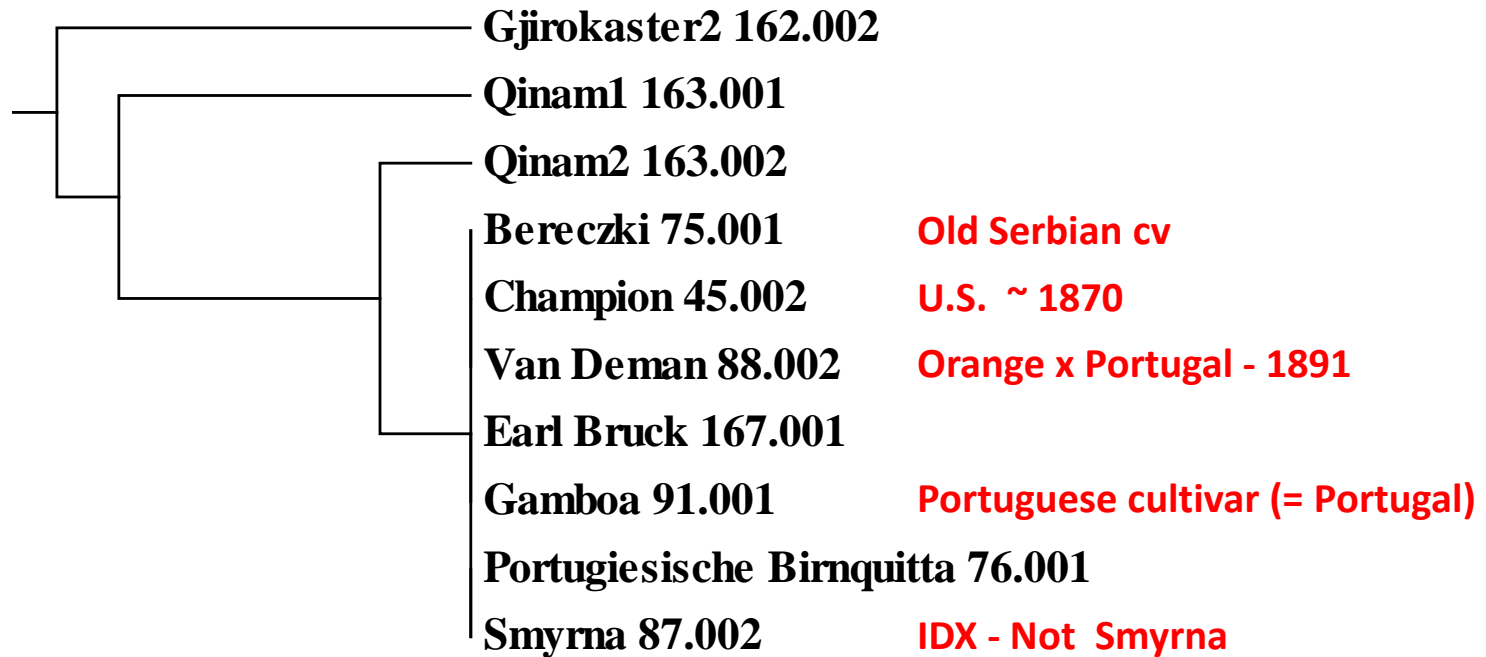


**Borgeault
Group (4)**

**Portugal
Group (7)**

0.05

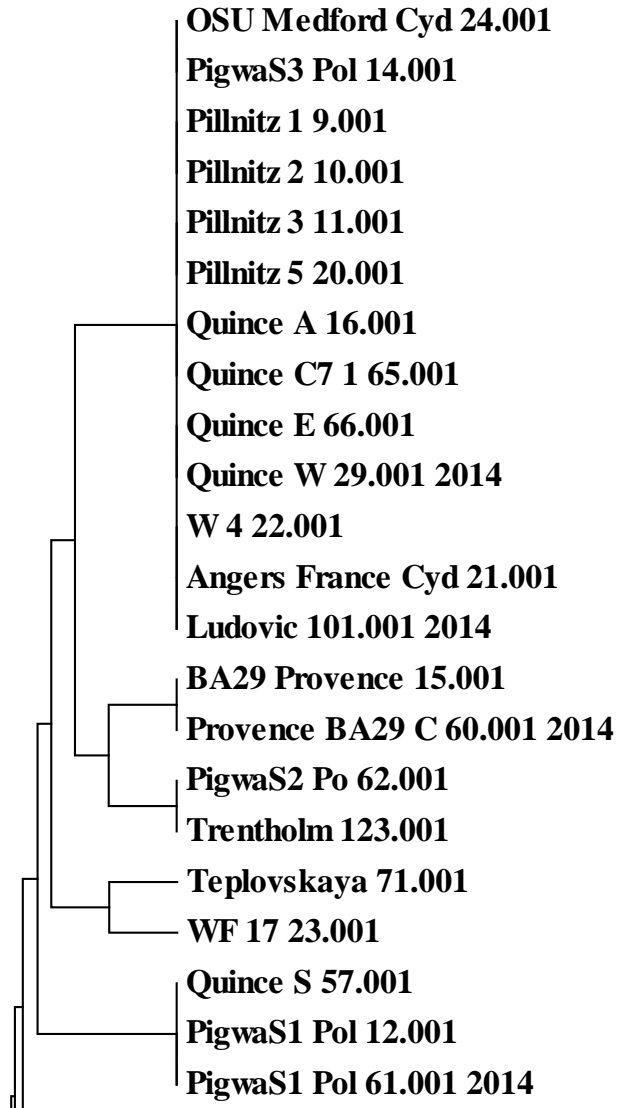
Earl Bruck (Portugal) Group (7)



Borgeault Group

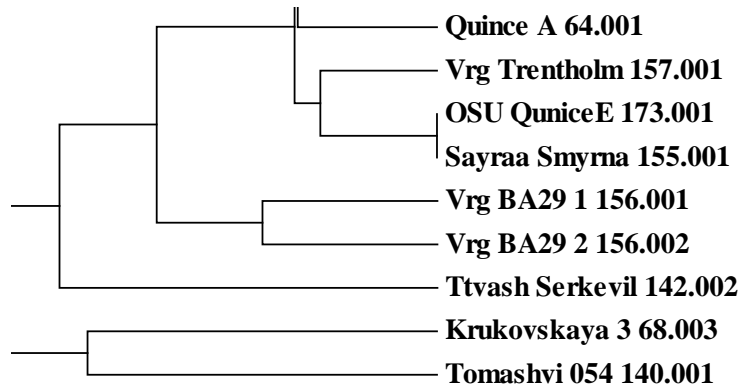


Quince A Group

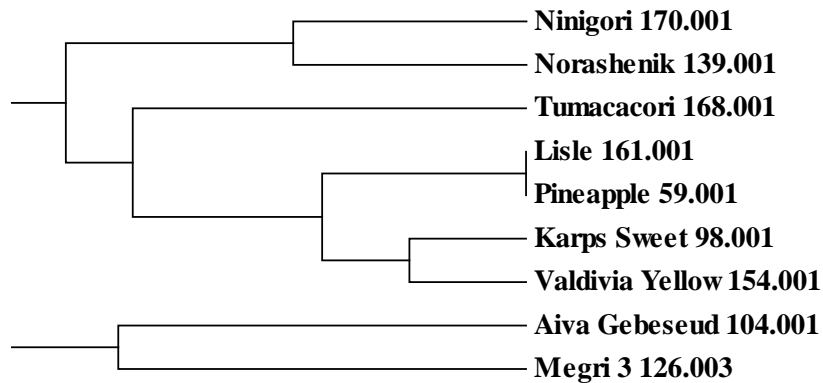


propagation errors

Other Synonyms



The “Real” Smyrna Quince



Harvey Lisle’s Quince



Introduced to Britain by Tradescant in 1611, but probably known in antiquity. Light orange pear-shaped fruit. Ripens earlier and breaks down more easily than Vranja. Flesh is quite golden when cooked, with a strong, fragrant flavour.

Portugal
= Gamboa
= Earl Bruck





CYD 76– Portugal



CYD 45 – Champion



CYD 75 – Bereczki

**Quince – Portugal “group”
Fruit and Foliage Phenotypes
3 July, 2014**



CYD 87 - Smyrna



CYD 88- Dan Deman



CYD 91– Gamboa

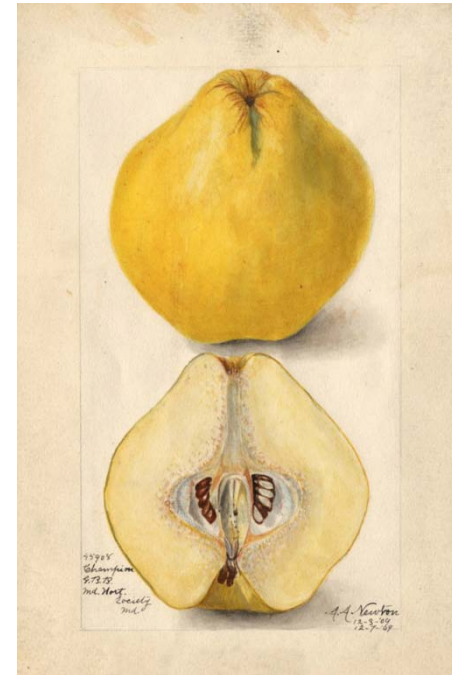
Historic Images



USDA Watercolors 1909



Borgeat



Champion

SSR Conclusions

- **12 clones indistinguishable from Quince A**
 - propagation error?
- **7 clones indistinguishable from Portugal**
 - some are mis-labeled, some may be synonyms
- **‘Meech’s Prolific’ is likely a synonym of ‘Borgeault’**
- **‘Lisle’ is likely a synonym of Luther Burbank’s ‘Pineapple’**
- **Need to obtain other sources of ‘Smyrna’ and ‘Van Deman’**
 - Van Deman said to be ‘Orange’ x ‘Portugal’ hybrid



Quest for Disease Resistant Quince



- **Greenhouse Inoculations –
Fire Blight**
- **Field Observations –
Rust, Powdery Mildew and Leafspot**



Fabraea Leafspot Symptoms



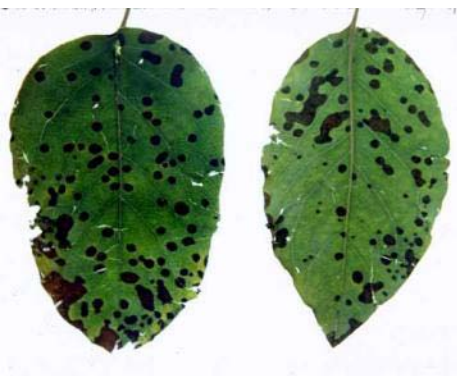
Quince
(Pscheidt)



Gamboa
(NCGR)



(not) Van Deman
(NCGR)



Quince
(Pscheidt)

Many Susceptible Quince Clones

1 = no symptoms

9 = severe

local	plantname	Fabraea 5/2003	Fabraea 6/2006	Fabraea 6/2007
12.001	Pigwa S-1 - Poland	8	8	7
21.001	Quince - Angers, France	9	8	7
113.001	Yuz-Begi 89-1		8	7
115.001	Hasardagskaya		8	7
118.001	C. oblonga - Seghani, Armenia		8	7
118.003	C. oblonga - Seghani, Armenia		8	7
66.001	Quince E	5	3	8
110.001	Kichikara Dede 88-2		3	8
119.002	C. oblonga - Alema, Armenia		3	8
70.003	Skorospelka O.P. seedling		7	8
85.001	Orange	3	7	8
118.002	C. oblonga - Seghani, Armenia		8	8
119.003	C. oblonga - Alema, Armenia		5	9
120.002	C. oblonga - Arakseni, Armenia		7	9
87.001	Smyrna	5	8	9

Least Susceptible Quince Clones

1 = no symptoms

9 = severe

local	plantname	Fabraea 5/2003	Fabraea 6/2006	Fabraea 6/2007	Fabraea fruit 2007
79.001	Limon	1	1	1	1
68.003	Krukovskaya O.P. seedling	2	3	1	1
93.001	Tencara Pink	2	3	1	1
108.001	TE-2-73		3	1	-
45.002	Champion	1		1	-
63.001	Pigwa S-3	1		1	-
50.002	Isfahan		1	3	-
121.001	Aromatnaya		1	3	2
69.002	Maslenka Rannaya O.P. seedling	2	2	3	3
32.003	C. oblonga - Uzbekistan		3	3	1
78.001	Ekmek	2	4	3	-

Quince – Resistant Cultivar



Limon (NCGR)



Cold Tolerant Quince

Joseph Postman

USDA-Agricultural Research Service, Corvallis

Todd Einhorn

Oregon State University, Hood River

Cold Hardiness Testing

About 57 quince accessions were selected for hardiness evaluation based on...

- Diverse horticultural traits and origins
- Perceived (or reported) as cold hardy

Compared to a range of pear controls including:

‘OHxF 87’, ‘OHxF 97, *P. pashia*, *P. ussuriensis*,
Bartlett, Krylov, Flemish Beauty (Lesnaia Krasavitsa)



Data Collected

Oxidative browning scale:

1 = white

2 = off-white

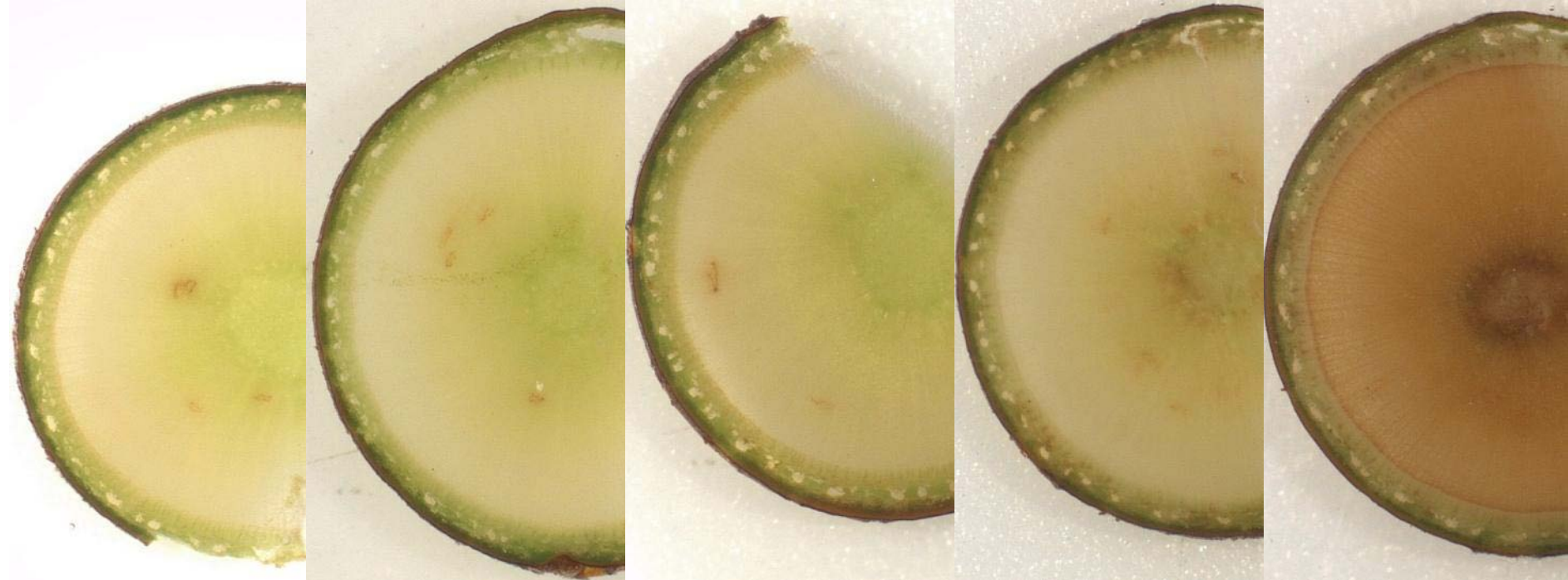
3 = 25 % light browning

5 = >75 % browning

6 = 100 % fully oxidized [black]



Hardness data reported as lowest exposure temperature with < 50% browning



32°F

14°F

-4°F

-22°F

-40°F

Quince Cold Hardiness

September

°F

32

14

-4

-22

-40

Temperature Prior to Incipient Freeze Damage (C)

0
-5
-10
-15
-20
-25
-30
-35
-40

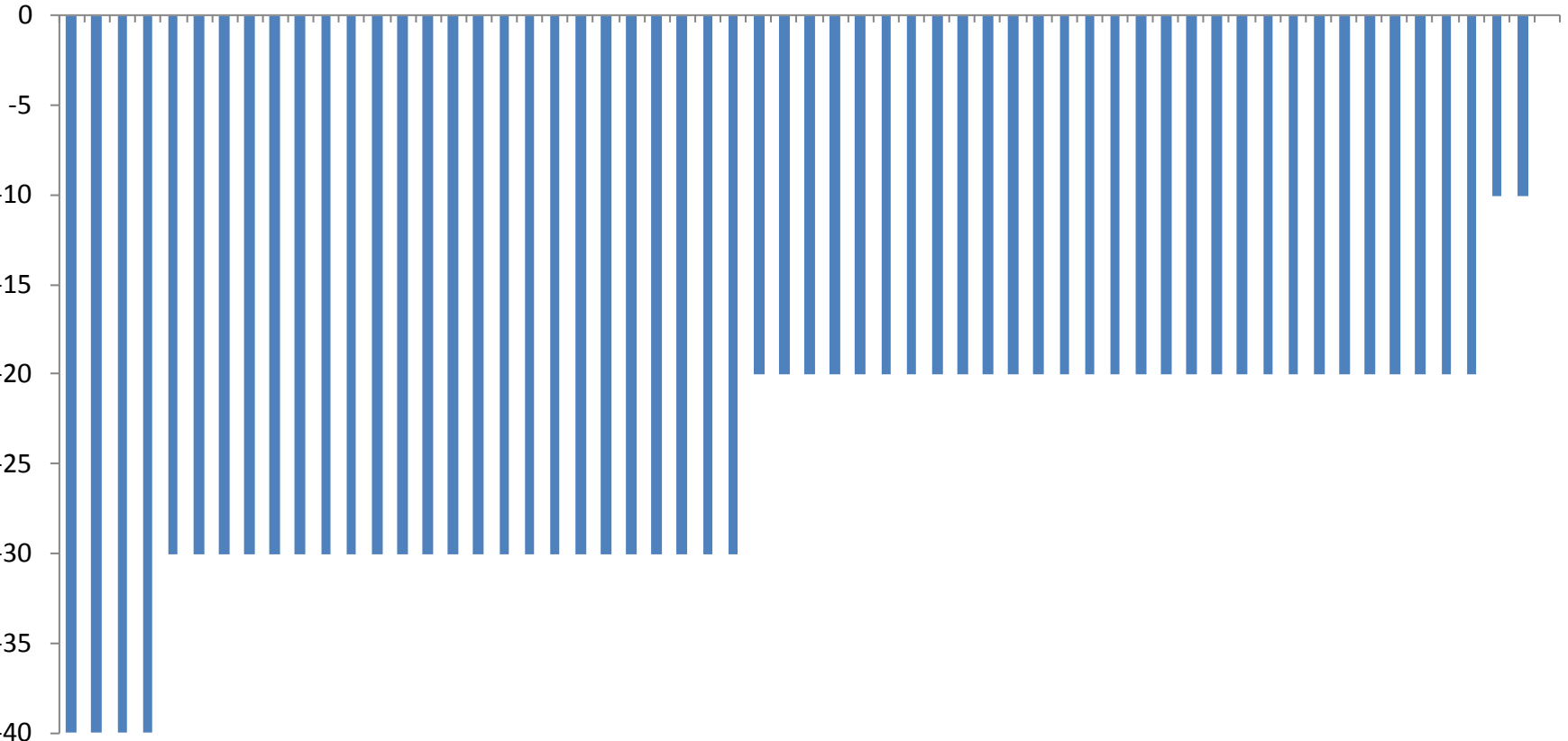
- Aiva from Gebeseud
- Aiva from Kara-Kala No.9
- Akhtubinskaya O.P. seedling (A)
- Akhtubinskaya O.P. seedling (B)
- Bereczki [Beretskiqittte]
- C. oblonga - Alema, Armenia
- C. oblonga - Arakseni, Armenia
- C. oblonga - Babaneuri, Georgia
- C. oblonga - Dusheti, Georgia
- C. oblonga - Megri, Armenia
- EkmeK
- Fontenay
- Karp's Sweet Quince - Majes Valley, Araq
- Kashenko No. 8
- Kichikara Dede 88-2
- Krimskaya
- Krukovskaya O.P. seedling
- Le Borgeot
- Limon
- Maslenka Rannaya O.P. seedling
- Meech's Prolific
- Pigwa S-1 - Poland
- Pigwa S-2 - Poland
- Pigwa S-3 - Poland
- Pillnitz 1
- Pillnitz 2
- Pillnitz 3
- Pillnitz 5
- Pineapple
- Portugiesische Bimquitta
- Provence (BA 29-C)
- Pyronia veitchii (= IGC 9)
- Quince A
- Quince C7/1
- Quince E
- Quince S
- Quince W
- Seker Gevrek
- Skorospelka O.P. seedling
- Sorbopyrus 'Smokvarka'
- Tashkent AR-232 seedling 2 (A)
- Tashkent AR-232 seedling 4 (B)
- TE-2-73
- Tekes
- Tencara Pink
- Teplovskaya O.P. seedling
- Trentholm
- Van Deman
- W-4
- WF-17
- Cooke's Jumbo
- C. oblonga - Seghani, Armenia
- Harbin (P. ussuriensis) (cold hardy)
- Krylov (cold hardy)
- OHxF 87
- OHxF 97
- P. koeinei (non hardy)
- P. pashia (non hardy)
- Yuz-Begi 83-4

Quince Cold Hardiness

December

°F
32
14
-4
-22
-40

Temperature Prior to Incipient Freeze Damage (C)



- C. oblonga - Segnani, Armenia
- Pillnitz 1
- Pillnitz 2
- WF-17
- Aiva from Gebeuc
- Akhtubinskaya O.P. seedling (A)
- Akhtubinskaya O.P. seedling (B)
- C. oblonga - Arakseni, Armenia
- C. oblonga - Babaneuri, Georgia
- C. oblonga - Megri, Armenia
- Fontenay
- Krylov (cold hardy)
- Lesnaia Krasavitsa (cold hardy)
- OHxF 97
- Pigwa S-1 - Poland
- Pigwa S-2 - Poland
- Pillnitz 5
- Provence (BA 29-C)
- Quince C7/1
- Quince S
- Quince W
- Sorbopyrus Smokvarka
- Tashkent AR-232 seedling 2 (A)
- Tashkent AR-232 seedling 4 (B)
- Teplovskaya O.P. seedling
- Trentholm
- W-4
- Aiva from Kara-Kara No. 2
- Bereczki [Beretskiutte]
- C. oblonga - Alema, Armenia
- C. oblonga - Dusheti, Georgia
- Cooke's Jumbo
- Ekmek
- Karp's Sweet Quince - Majes Valley, Araucaria
- Kashenko No. 8
- Kichikara Dede 88-2
- Krimskaya
- Krukovskaya O.P. seedling
- Le Borgeot
- Limon
- Maslenka Rannaya O.P. seedling
- Meech's Prolific
- OHxF 87
- Pigwa S-3 - Poland
- Pillnitz 3
- Pineapple
- Portugiesische Bimquitta
- Pyronia veitchii (= IGC 9)
- Quince A
- Quince E
- Seker Gevrek
- Skorospelka O.P. seedling
- TE-2-73
- Tekes
- Tencara Pink
- Van Deman
- P. bohemica (non hardy)
- P. pashia (non hardy)
- Harbin (P. ussuriensis) (cold hardy)

Quince Cold Hardiness

February

°F

32

14

-4

-22

-40

Temperature Prior to Incipient Freeze Damage (C)

0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0

Aiva from Gebeseud	-20.0
Aiva from Kara-Kala No.9	-20.0
Akhtubinskaya O.P. seedling (B)	-20.0
Bereczki [Beretskiqutte]	-20.0
C. oblonga - Alema, Armenia	-20.0
C. oblonga - Arakseni, Armenia	-20.0
C. oblonga - Babaneuri, Georgia	-20.0
C. oblonga - Dusheti, Georgia	-20.0
C. oblonga - Megri, Armenia	-20.0
C. oblonga - Seghani, Armenia	-20.0
Ekmeq	-20.0
Le Borgeot	-20.0
Limon	-20.0
OHxF 87	-20.0
Pigwa S-2 - Poland	-20.0
Pillnitz 2	-20.0
Pineapple	-20.0
Quince C7/1	-20.0
Quince S	-20.0
Tashkent AR-232 seedling 4 (B)	-20.0
TE-2-73	-20.0
Tencara Pink	-20.0
Teplovskaya O.P. seedling	-20.0
Trentholm	-20.0
W-4	-20.0
Quince E	-20.0
Akhtubinskaya O.P. seedling (A)	-10.0
Cooke's Jumbo	-10.0
Fontenay	-10.0
Karp's Sweet Quince - Majes Valley, Araq	-10.0
Kichikara Dede 88-2	-10.0
Krimskaya	-10.0
Maslenka Rannaya O.P. seedling	-10.0
Meech's Prolific	-10.0
Pigwa S-1 - Poland	-10.0
Pigwa S-3 - Poland	-10.0
Pillnitz 1	-10.0
Pillnitz 3	-10.0
Pillnitz 5	-10.0
Portugiesische Bimquitta	-10.0
Provence (BA 29-C)	-10.0
Pyronia veitchii (= IGC 9)	-10.0
Quince A	-10.0
Quince W	-10.0
Seker Gevrek	-10.0
Skorospelka O.P. seedling	-10.0
Tashkent AR-232 seedling 2 (A)	-10.0
Tekes	-10.0
Van Deman	-10.0
WF-17	-10.0
Harbin (P. ussuriensis) (cold hardy)	-10.0
Kashenko No. 8	-10.0
Krukovskaya O.P. seedling	-10.0
Krylov (cold hardy)	-10.0
Lesnaia Krasavitza (cold hardy)	-10.0
OHxF 97	-10.0
P. koeinei (non hardy)	-10.0
P. pashia (non hardy)	-10.0
Sorbopyrus Smokvarka	-10.0

Top 10 Cold Hardy Quince Clones



rank	accession	name	oxidative browning score (1-6)	origin
1	120.001	C. oblonga - Arakseni	1.50	Armenia
2	104.001	Aiva from Gebeseud	2.39	Turkmenistan
3	67.004	Akhtubinskaya O.P. sdlg. 4	2.42	Russia
4	32.004	Tashkent AR-232 sdlg. 4	2.75	Uzbekistan
5	70.001	Skorospelka O.P. sdlg. 1	2.86	Russia
6	57.001	Quince S	3.00	Poland
7	29.001	Quince W	3.00	England
8	126.001	C. oblonga - Megri	3.03	Armenia
9	118.001	C. oblonga - Seghani	3.08	Armenia
10	32.002	Tashkent AR-232 sdlg. 2	3.14	Uzbekistan

mean oxidative browning scores December 2009, 2010, 2011

**A few “choice”
quince in the
USDA Collection**



Leading cultivar in California released by Luther Burbank in 1899. Fruit large, roundish, golden, smooth; flesh white, pineapple-like flavor, slightly aromatic, tender when cooked. Tree productive, cold hardy, tolerates wet soil, blooms late, flowers tinted pink, self-fertile.



Pineapple – a Luther Burbank variety

Old Serbian cultivar named after Hungarian pomologist Professor Bereczki. Fruit large, pear shaped, golden yellow. Quality very good, tender when cooked. Tree vigorous, heavy yielding, precocious.



Bereczki – from Serbia or Germany (=Portugal?)

U.S. origin about 1870. Fruit large, yellow-green; flesh white to yellow, tender, slightly astringent; midseason, keeps well. Tree vigorous, cold hardy, precocious, productive; may not mature in regions with short season.



Champion – from U.S. (=Portugal?)

O.P. seedling of Russian cultivar Maslenka Rannaya. Seed received from Volgograd, Russia in 1990. Large, high quality fruit, high production, good resistance to fungal diseases, resistance to cracking following autumn rains.



NCGR selection from Russian seed – Claribel (proposed)



Brought to the US from Turkey in 1986. Fruit large, pyriform, attractive; skin yellow, thick, slightly hairy; flesh crisp, juicy, mild flavor; mid-season, good storage. Tree: open canopy, vigorous and productive. Ekmek group includes many sub-types.



Ekmek – from Turkey



Krimskaya – from Ukraine

Limon – from Turkey



Lemon-shaped, brought to US from Turkey in 1986. Fruit medium, yellow, skin thick and hairy; flesh yellowish, crisp, hard, juicy, mild; mid-season, good storage. Tree vigorous, upright when young becoming pendulous.



Non-astringent, brought to the US from Turkey in 1986. Fruit even shaped, tapering toward both ends; skin bright yellow, thin and slightly hairy; flesh crispy, slightly sour; mid-season, good storage. The name means 'Sweet and Crispy'.



Sekergevrek - from Turkey



Shams - from Iran

Seeds collected in Tashkent, Uzbekistan in 1982. Promising in the Pacific Northwest and other cool areas. All seedlings from this seedlot ripen significantly earlier and are more cold-hardy than other quinces.



Tashkent No. 4 - Early Ripe from Uzbekistan



NCGR-Corvallis - *Cydonia* Germplasm

Related Topics

- > [NCGR Home](#)
- > [NCGR-Corvallis Distribution Policies](#)

NCGR-Corvallis - *Cydonia* Germplasm

Quince Genetic Resources

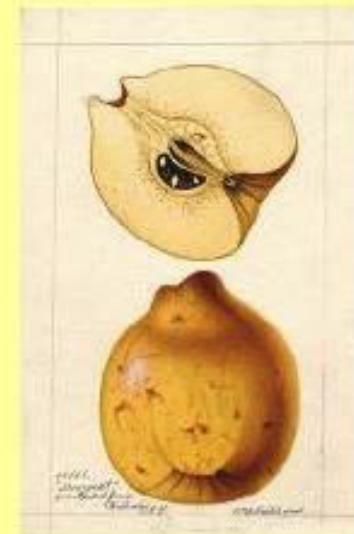
Please make requests for dormant scions between Sept. and Feb. 1

NCGR *Cydonia* Catalogs
(includes *Chaenomeles*, *Docynia*,
Pseudocydonia, *Pyronia*):

- [All Quince Cultivars and Selections](#)
- [Fruiting Varieties](#)
- [Rootstock Varieties](#)
- [Curators Choice!](#)
(some of our favorite cultivars)
- [Trait Subsets](#)
 - [Cold Hardy Quinces](#)
 - [Large Fruit](#)
 - [Fabraea Leafspot Resistant](#)
 - [Powdery Mildew Resistant](#)
 - [Rust Resistant](#)
- [Cydonia Seed Accessions](#)

Query the GRIN Database

- [Retrieve List of *Cydonia* species from GRIN taxonomy database](#)
- [Summary of *Cydonia* germplasm collection by species](#)
- [Summary of *Cydonia* germplasm collection by country of origin](#)



Pests and Diseases

- [Oregon Plant Disease Online Reference - Quince](#)
- [Pome Fruit Viruses and other disease descriptions - from the Clean Plant Center Northwest](#)



Thank You