



バレイショ栽培種とその起源

1

Classification of cultivated species by Hawkes (1990)	
$2n=2x=24$	<i>S. stenotomum</i> Juz. et Buk. ssp. <i>stenotomum</i> ssp. <i>goniocalyx</i> <i>S. phureja</i> Juz. et Buk. ssp. <i>phureja</i> ssp. <i>hygrothermicum</i> ssp. <i>estradae</i> <i>S. ajanhuiri</i> Juz. et Buk.
$2n=3x=36$	<i>S. chaucha</i> Juz. et Buk. <i>S. juzepczukii</i> Buk.
$2n=4x=48$	<i>S. tuberosum</i> L. ssp. <i>tuberosum</i> ssp. <i>andigena</i> - Common potato - Andigena potato
$2n=5x=60$	<i>S. curtilobum</i> Juz. et Buk.

Hawkes (1990) The potato: evolution, biodiversity and genetic resources. Belhaven Press

2

Classification of cultivated species by Dodds (1962) in Correll (1962)

S. tuberosum

Group Stenotomum
Group Phureja

$2n=2x=24$

Group Chaucha

$2n=3x=36$

Group Tuberosum
Group Andigena

$2n=4x=48$

S. x juzepczukii

$2n=3x=36$

S. x curtilobum

$2n=5x=60$

Correll (1962) The potato and its wild relatives.
Texas Research Foundation, Renner, Texas, USA

3

Classification of cultivated species by Huamán and Spooner (2002)

S. tuberosum

$2n=2x=24$

Ajanhuiri Group
Stenotomum Group
Phureja Group

$2n=3x=36$

Juzepczukii Group
Chaucha Group

$2n=4x=48$

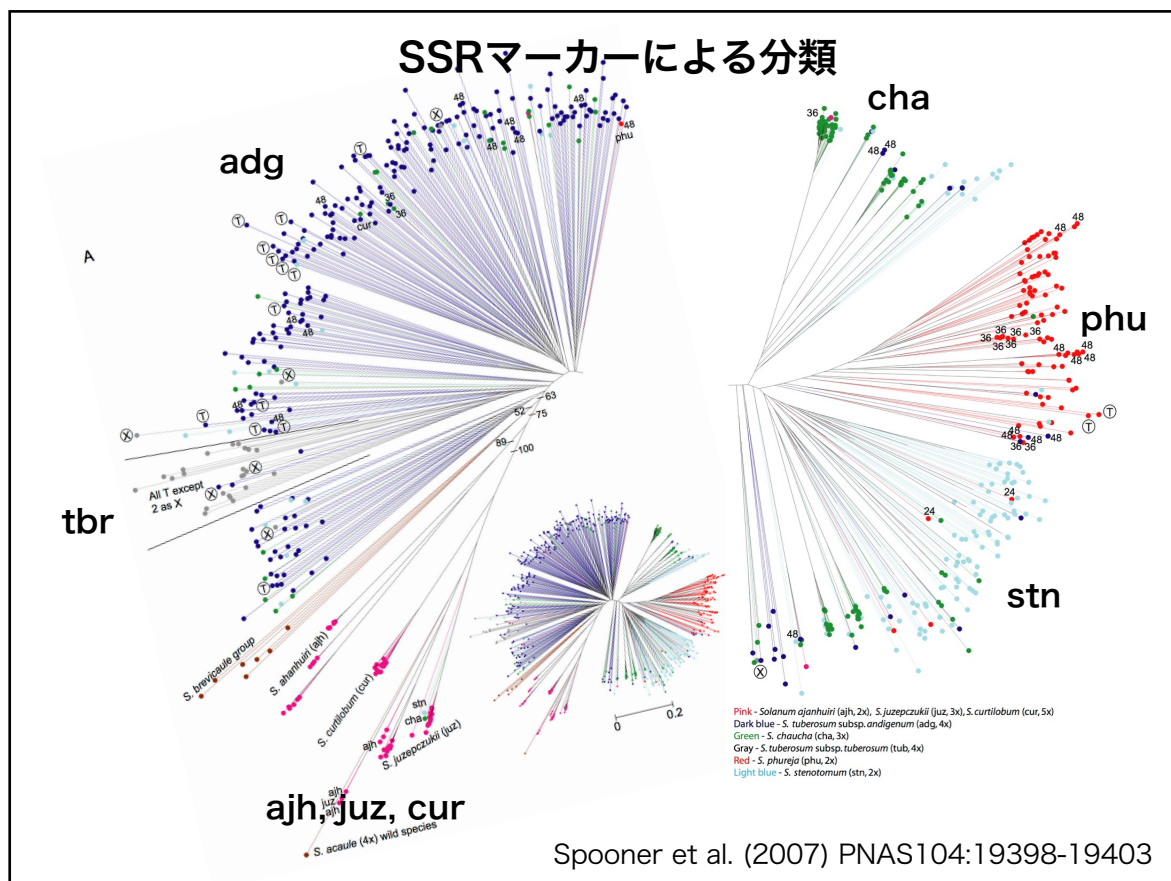
Andigena Group
Chilotanum Group
(Modern cultivar Group)

$2n=5x=60$

Curtilobum Group

Huamán and Spooner (2002) Am J Bot 89:947-965

4



5

Classification of cultivated species by Spooner et al. (2007)

S. tuberosum

Andigenum Group $2n=2x=24$

$2n=3x=36$

$2n=4x=48$

Chilotanum Group $2n=4x=48$

S. ajanhuiri $2n=2x=24$

S. juzepczukii $2n=3x=36$

S. curtilobum $2n=5x=60$

6



Hawkes (1990) The potato: evolution, biodiversity and genetic resources. Belhaven Press

Distribution of cultivated diploid potatoes

7



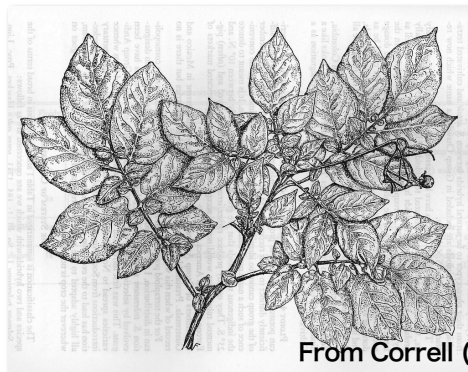
S. tuberosum ssp. *andigena*
アンディジェナ・バレイショ

S. tuberosum ssp. *tuberosum*
チリ原産4倍性栽培バレイショ
普通バレイショ

Hawkes (1990) The potato: evolution, biodiversity and genetic resources. Belhaven Press

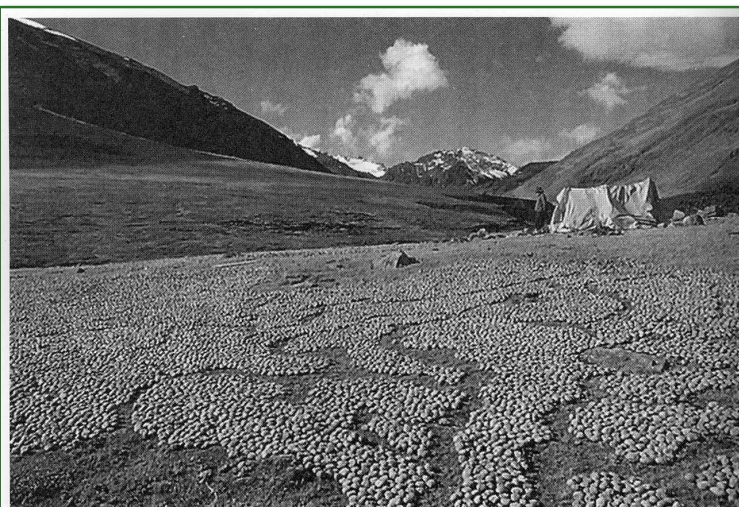
Distribution of cultivated polyploid potatoes

8

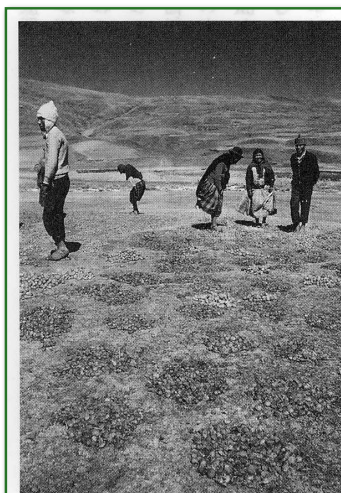
Differences between ssp. <i>andigena</i> and ssp. <i>tuberosum</i>		
		
	From Correll (1962)	
Characteristics	<i>andigena</i>	<i>tuberosum</i>
Leaf shape	Dissected	Less dissected
Width of a terminal leaflet	Narrow	Wide
Leaf angle attached to stem	Narrow	Wide
Day length for tuber initiation	Short	Long or neutral

9

Freeze-dried potato, 'Chuño', processed from bitter potatoes (*S. juzepczukii* and *S. curtilobum*)



チューニョづくり まず、ジャガイモを標高 4000 m 前後の高地に広げ数日間放置する。

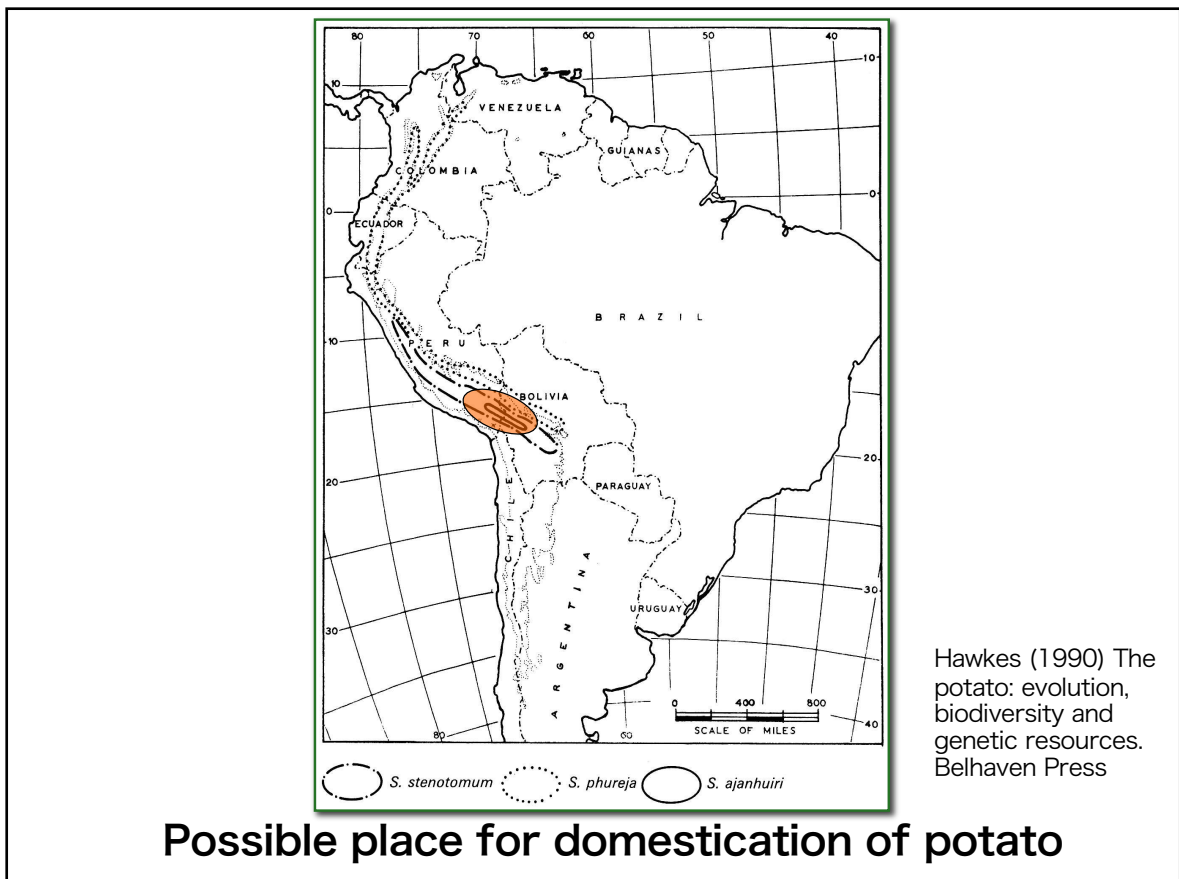


ジャガイモの脱汁 十分に膨潤したジャガイモを小山状に積み上げ足で踏んで脱汁する。

山本紀夫 (2004) 「ジャガイモとインカ帝国」



11



12



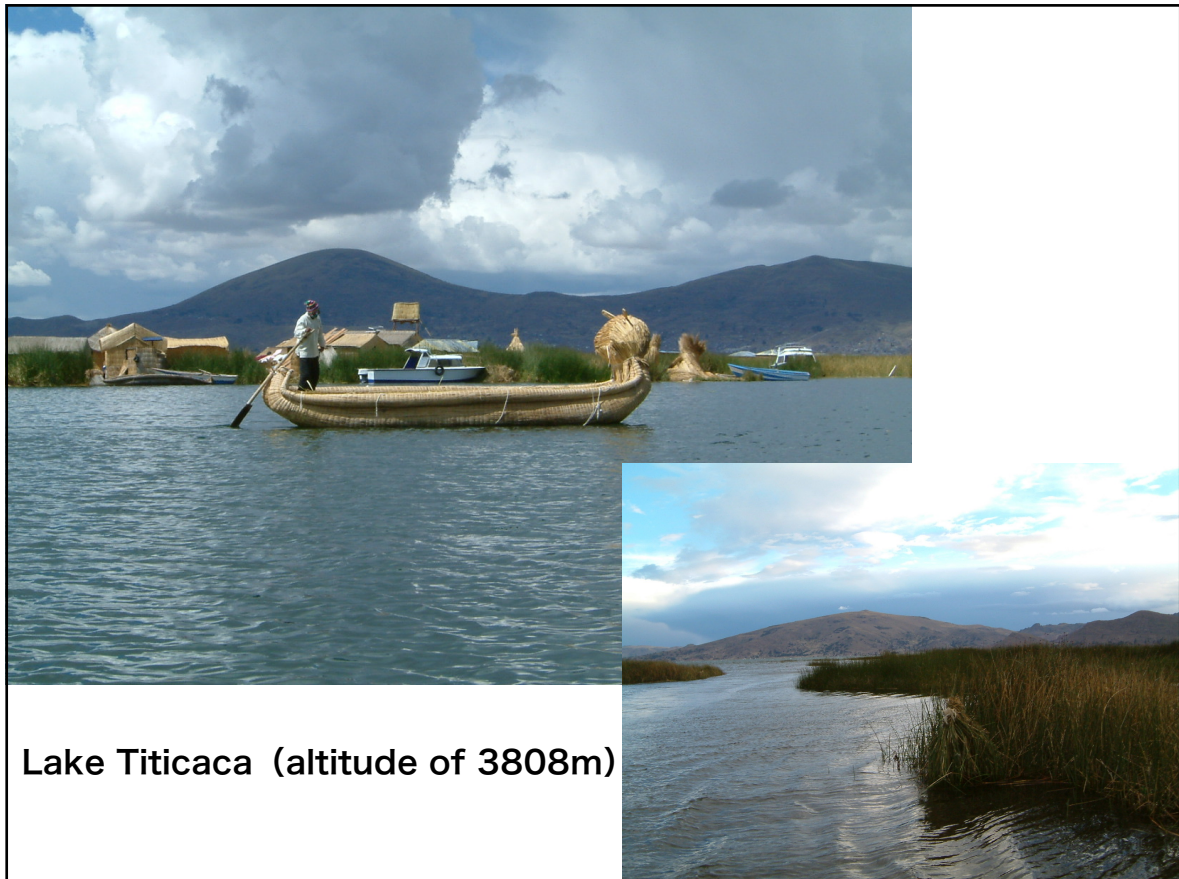
Western slopes of the Andes

13



Central Plaza in Cusco, Peru (altitude of 3399m)

14



15



16



A local market in Puno, Peru (altitude of 3827m)

17

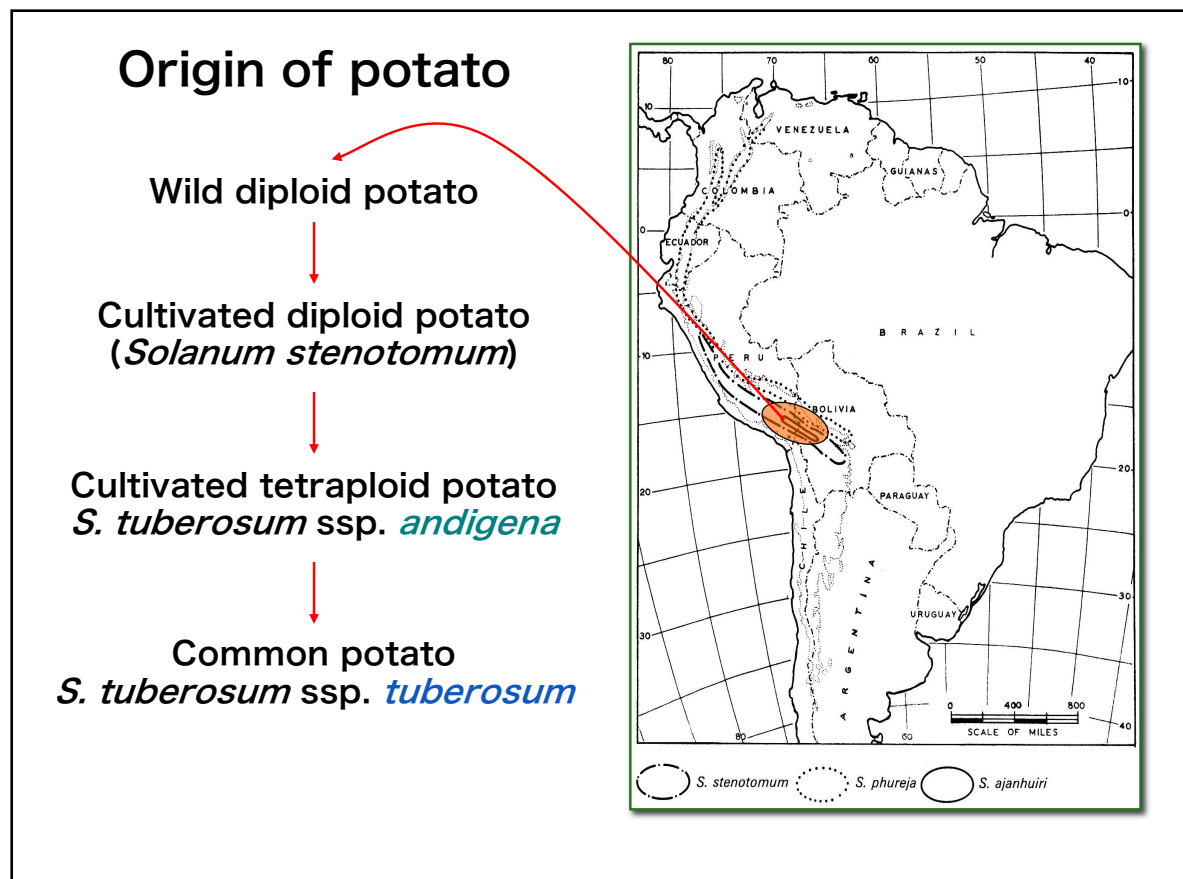


A local market in Cusco, Peru

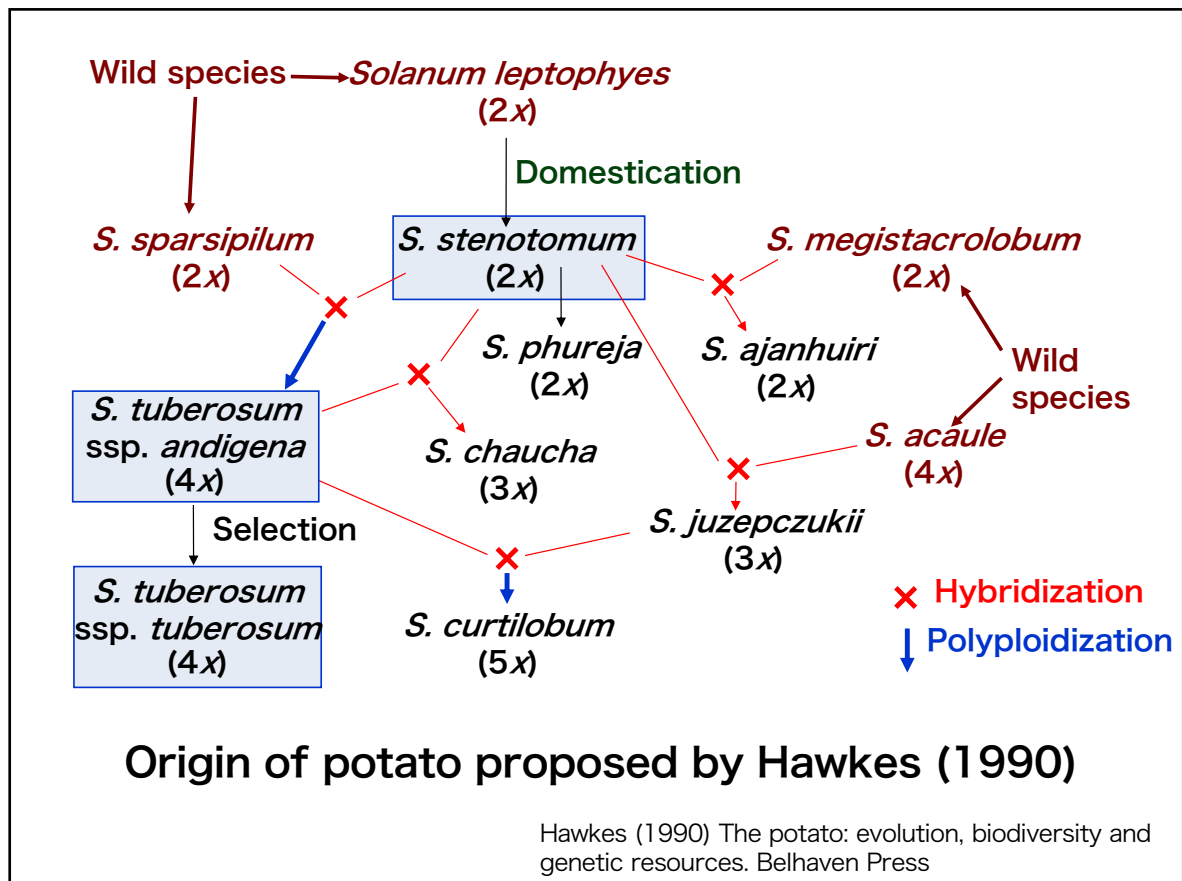
18



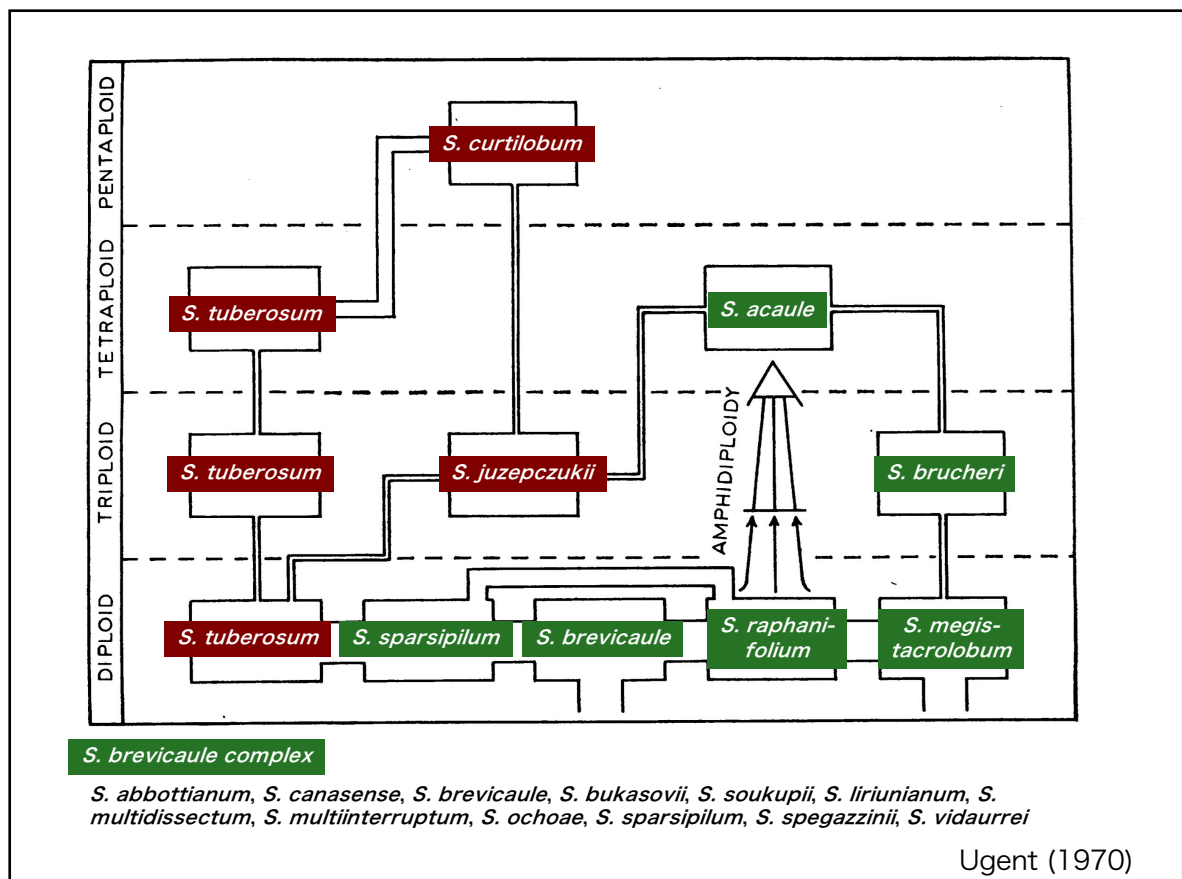
19



20



21



22

Male sterility in potato

Table 52.2. Cytoplasmic sensitivities of cultivated potato species and some of their relatives¹

Taxon	[<i>df</i> ²]	[<i>lo</i> ³]	[<i>Sp</i> ²]	[<i>SM</i> ²]	[<i>In</i> ²]	[<i>TA</i> ²]	[<i>ASF</i> ²]	[<i>VSA</i> ²]	[<i>Fm</i> ²]
<i>S. tuberosum</i>									
<i>ssp. tuberosum</i>									
Northern Hemisphere	—	— ³	+	+	+	+	+	+	+
Coastal Chile	—	—	+	+	+	+	+	+	?
<i>ssp. andigena</i>	—	+	—	—	—	—	—	—	—
<i>S. stenotomum-phureja</i>	+	(+)	—	—	—	—	—	—	—
<i>S. vernei</i>	—	?	—	—	—	—	—	—	—
<i>S. maglia</i> ³	(—)	?	(—)	(—)	(—)	?	(—)	(—)	(—)
<i>S. chacoense</i> f. <i>gibberulosum</i>	—	(—)	+	+	+	?	?	?	?

¹ Based on data in reference cited in Table 52.1, (*S. maglia* results from Grun, unpubl.). Values in parentheses are results of tests of cytoplasm of single clones.

+, Presence of indicated cytoplasmic factor; —, absence of indicated cytoplasmic factor.

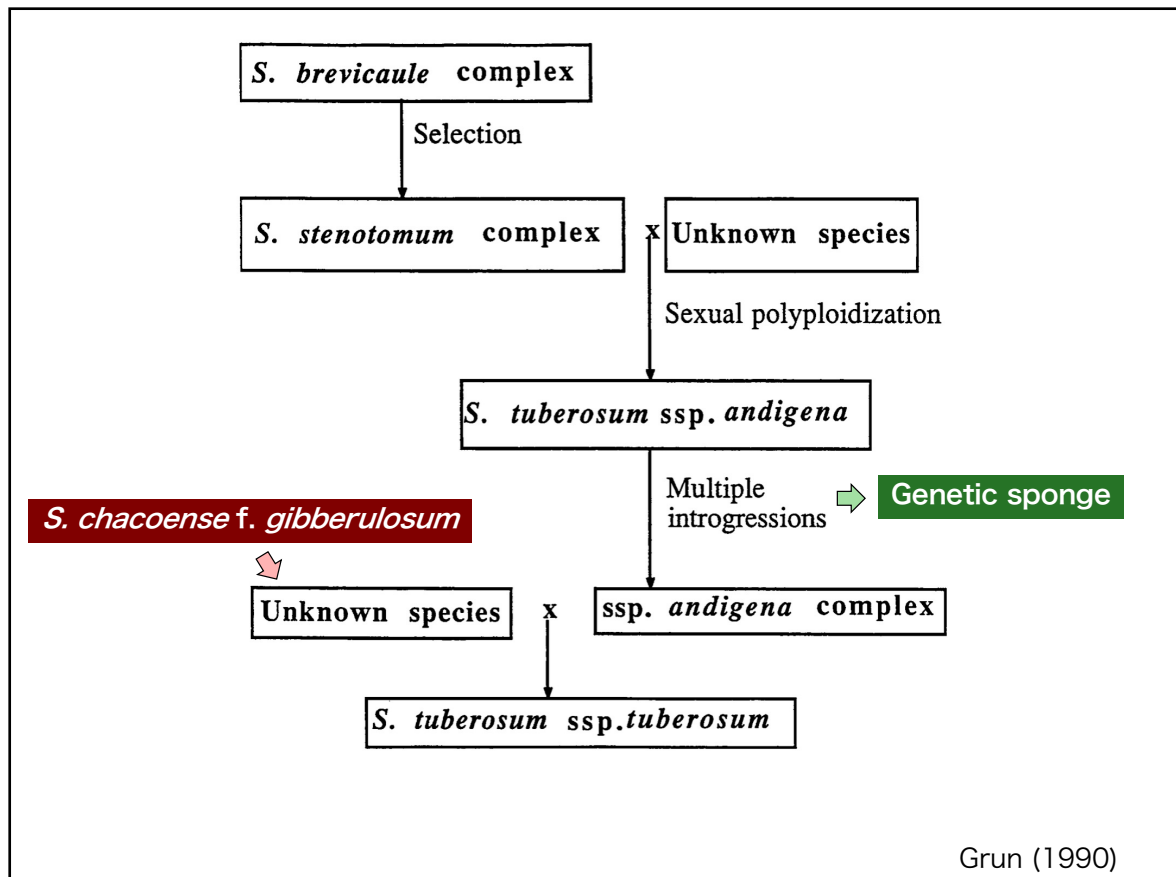
² Based on test of the cytoplasm of a triploid clone from Valparaiso Province, Chile.

³ One exception exists, the clone Hindenburg apparently having [*lo*³].

Grun (1979)

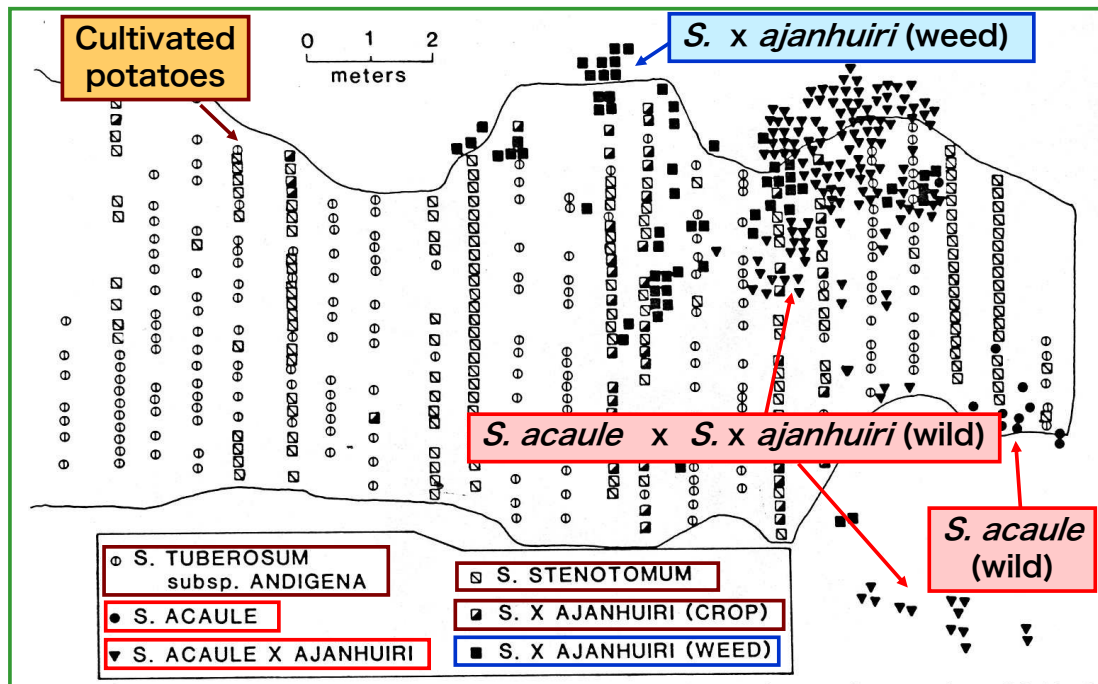
Caused by interaction with *ssp. tuberosum* cytoplasm

23



24

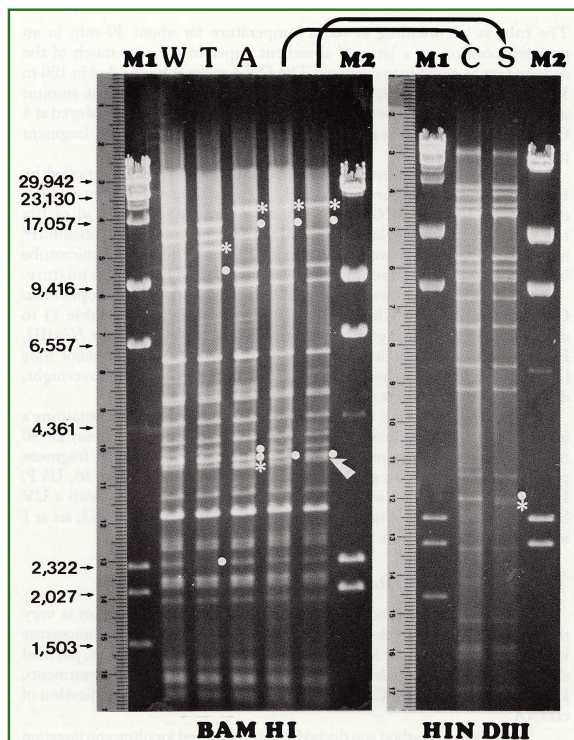
A native potato field in Bolivia (3950m)



Frequent natural hybridization!

Johns & Keen (1986)
Econ Bot 40:409-424

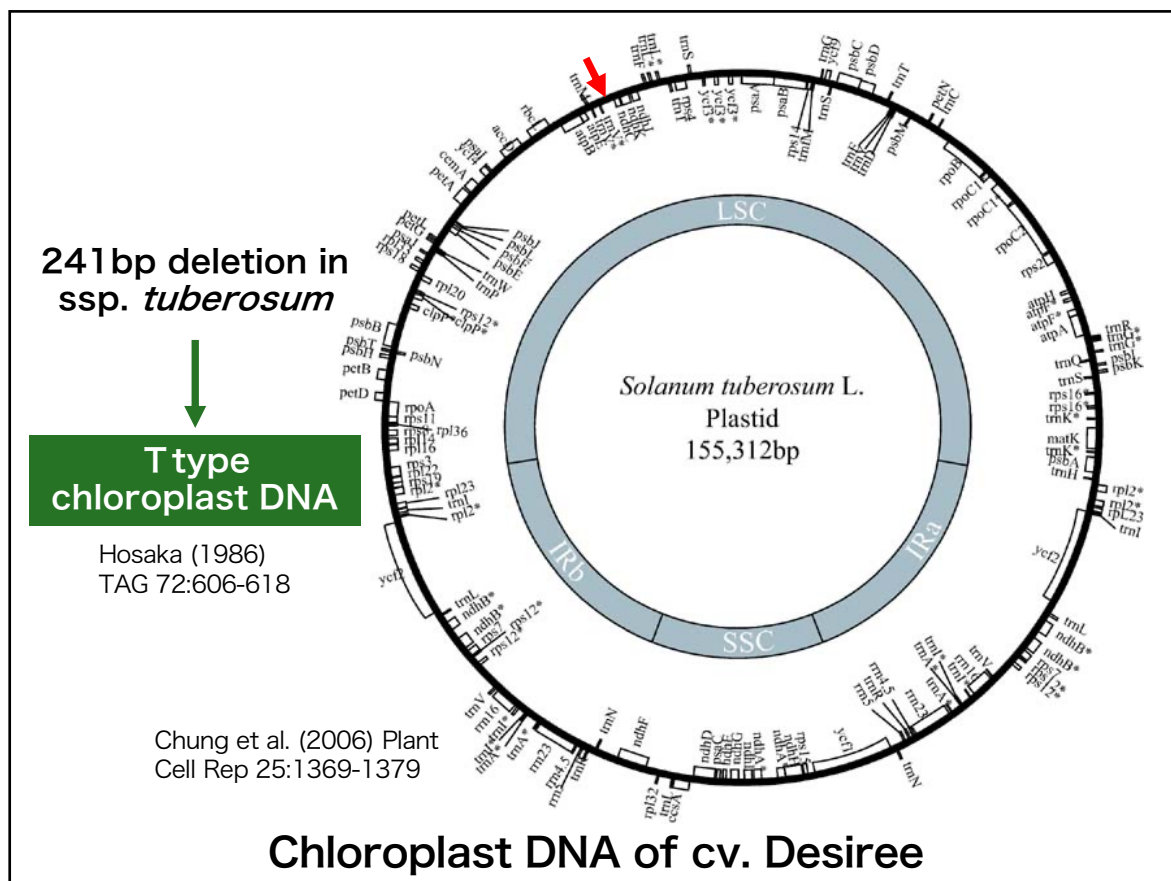
25



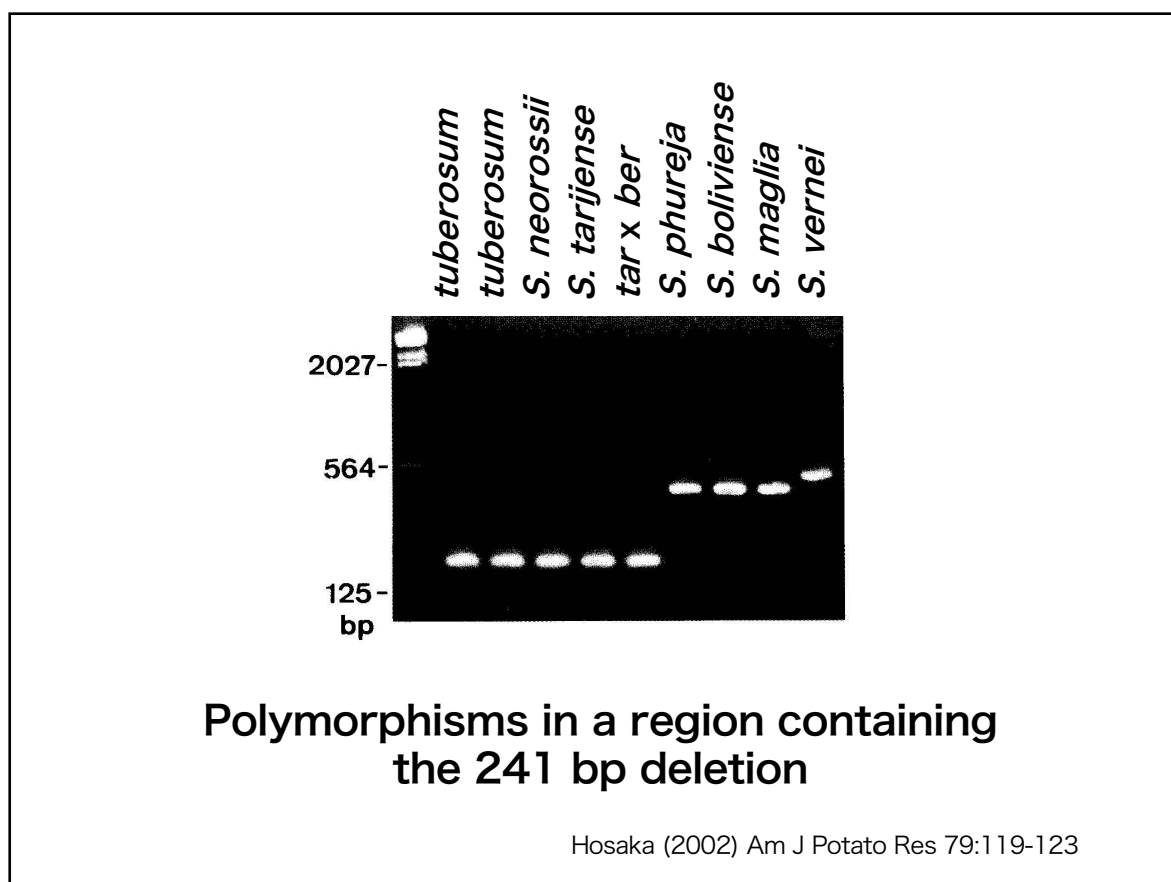
Hosaka (1986)
TAG 72:606-618

***Bam*HI and *Hind*III restriction digestion patterns of potato chloroplast DNA**

26



27



28

Series *Yungasensa*

<i>S. arnezii</i>	4
<i>S. chacoense</i>	42
<i>S. tarijense</i>	43 19
(<i>tar</i> x <i>ber</i> hybrids	25 4)

Series *Megistacroloba*

<i>S. astleyi</i>	2
<i>S. boliviense</i>	11
<i>S. megistacrolobum</i>	13
<i>S. sanctae-rosae</i>	11
<i>S. toralapanum</i>	32

Series *Maglia*

<i>S. maglia</i>	2
------------------	---

Series *Tuberosa*

<i>S. achacachense</i>	1
<i>S. alandiae</i>	15
<i>S. avilesii</i>	4
<i>S. berthaultii</i>	30

<i>S. brevicaule</i>	15
<i>S. candolleanum</i>	5
<i>S. x doddsii</i>	11
<i>S. gandarillasii</i>	7
<i>S. gourlayi</i>	35
<i>S. hondelmannii</i>	17
<i>S. hoopesii</i>	4
<i>S. incamayoense</i>	8
<i>S. kurtzianum</i>	14
<i>S. leptophyes</i>	13
<i>S. microdontum</i>	57
<i>S. neocardenasii</i>	2
<i>S. neorossii</i>	3 2
<i>S. okadae</i>	16
<i>S. oplocense</i>	39
<i>S. sparsipilum</i>	30
<i>S. spegazzinii</i>	10
<i>S. x sucrense</i>	25
<i>S. ugentii</i>	3
<i>S. venturii</i>	4
<i>S. vernei</i>	29
<i>S. virgultorum</i>	5

Hosaka (2002) Am J Potato Res 80:21-32

29



***Solanum tarijense* Hawkes,
a maternal parent of potato**

Hosaka (2003) Am J Potato Res 80:21-32

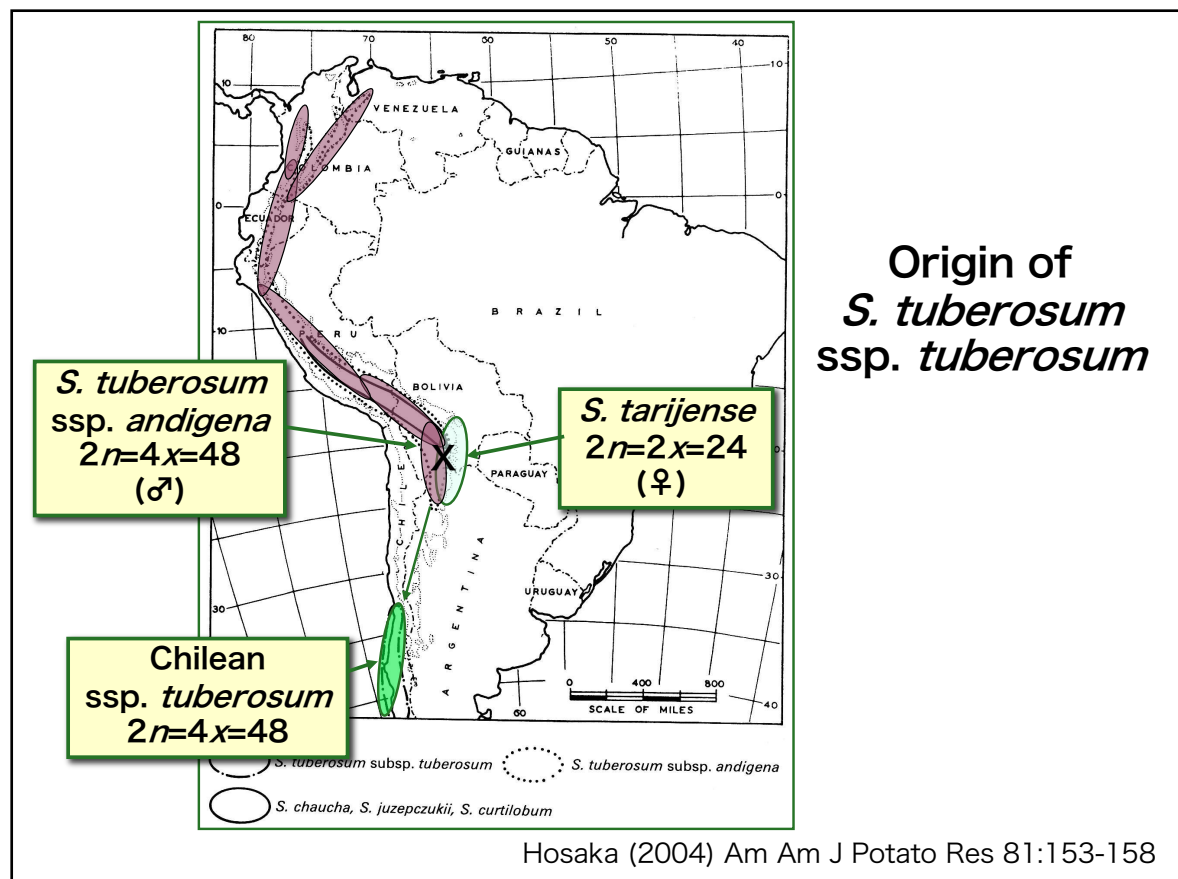
30

The number of accessions surveyed and those having T-type chloroplast DNA (parenthesized) in Andean and Chilean cultivated potatoes

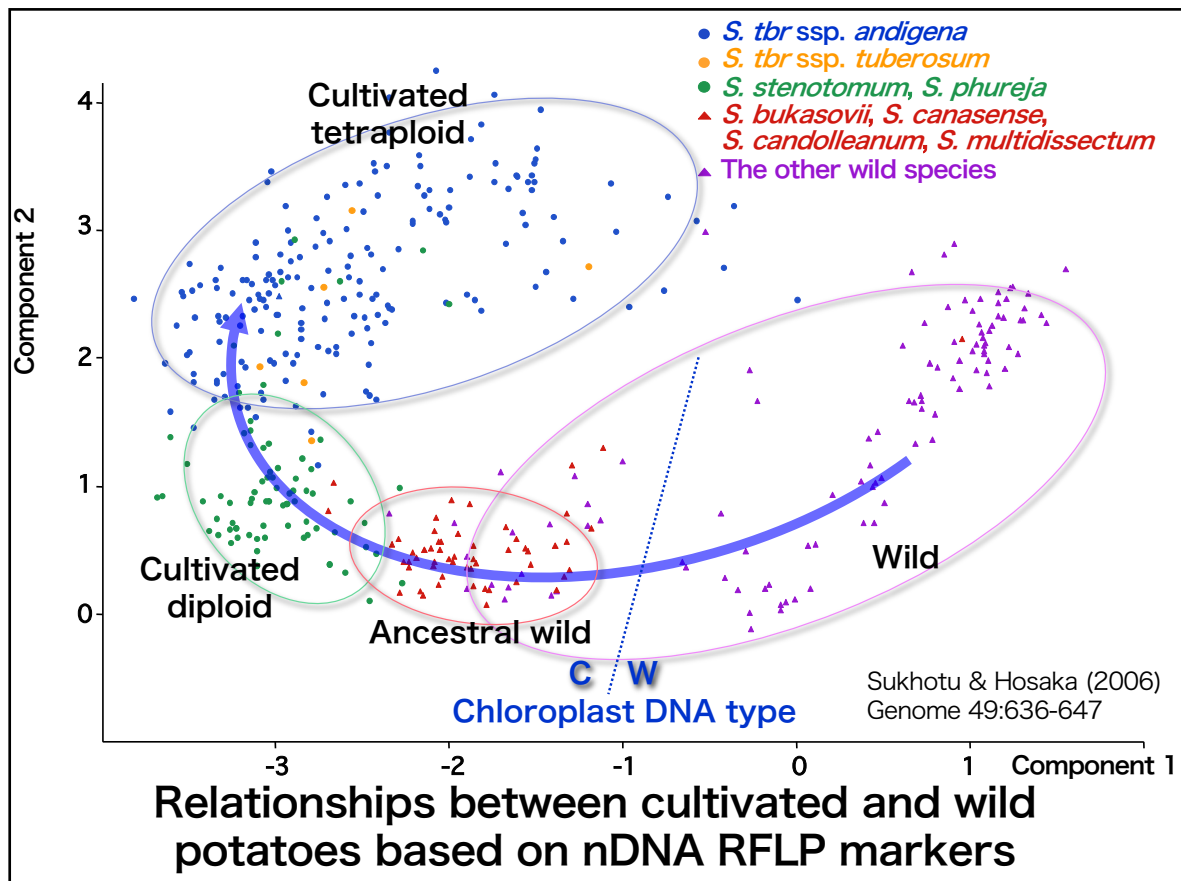
Country	<i>S. stenotomum</i> ssp.		<i>S. tuberosum</i> ssp.	
	<i>goniocalyx</i>	<i>stenotomum</i>	<i>andigena</i>	<i>tuberosum</i>
Mexico	0	0	8	0
Guatemala	0	0	2	0
Costa Rica	0	0	1	0
Venezuela	0	0	3	0
Colombia	0	1	20	0
Ecuador	0	0	14 (1)	0
Peru	10	127	82	0
Bolivia	1	76	74	0
Argentina	0	0	81 (7)	0
Chile	0	0	1 (1)	28 (24)
Total	11	204	286 (9)	28 (24)

Hosaka (2004) Am Am J Potato Res 81:153-158

31



32



33

A single domestication for potato based on multilocus amplified fragment length polymorphism genotyping

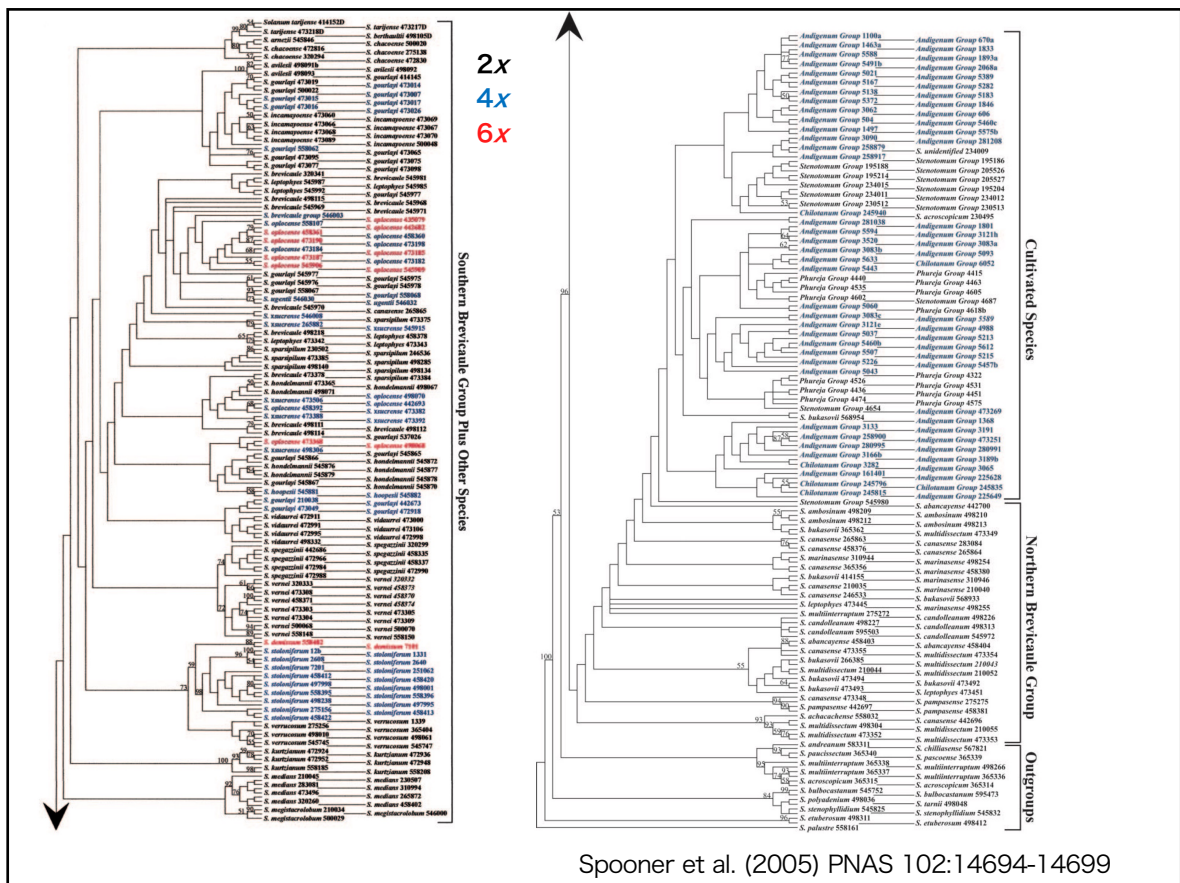
David M. Spooner^{*†}, Karen McLean[‡], Gavin Ramsay[‡], Robbie Waugh[‡], and Glenn J. Bryan[‡]

^{*}U.S. Department of Agriculture, Agricultural Research Service, Vegetable Crops Research Unit, Department of Horticulture, University of Wisconsin, 1575 Linden Drive, Madison, WI 53706-1590; and [†]Genome Dynamics Programme, Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA, United Kingdom

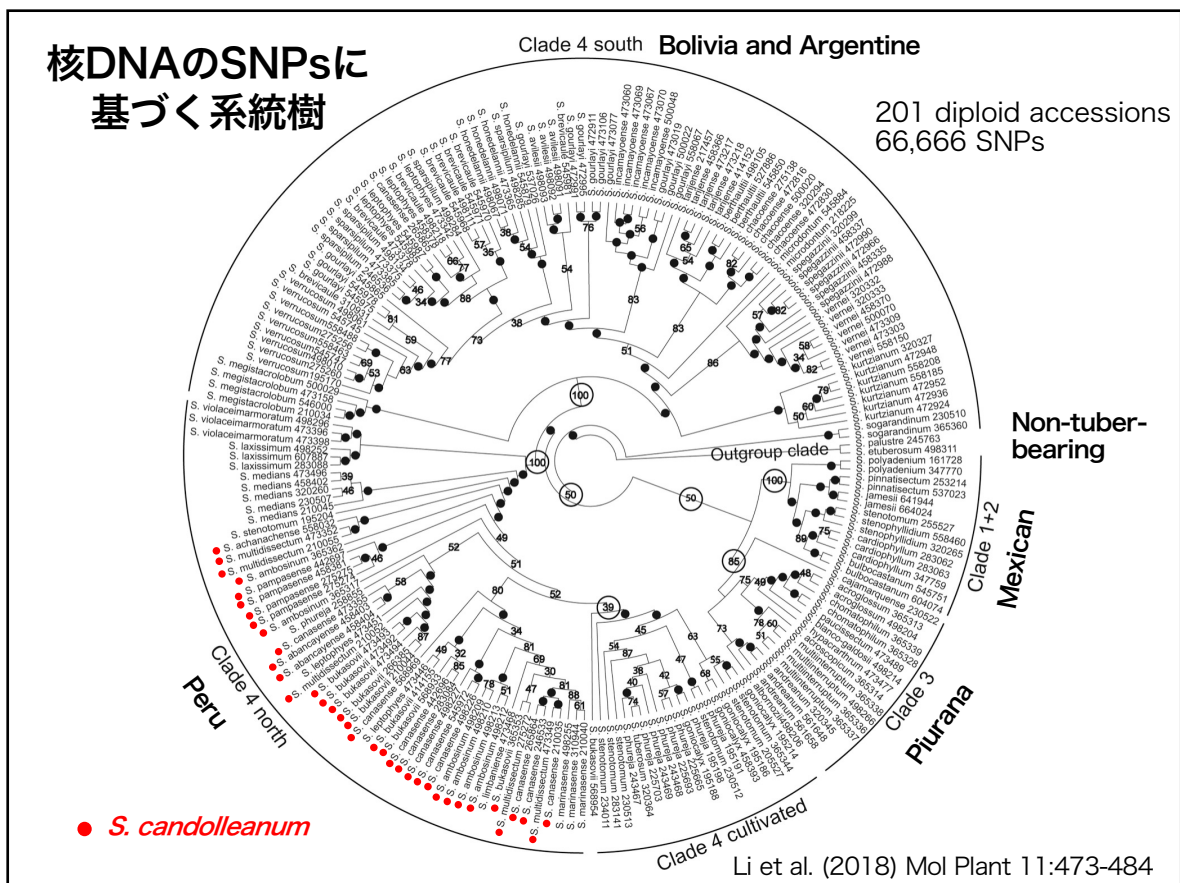
We present phylogenetic analyses based on the representative cladistic diversity of 362 individual wild (261) and landrace (98) members of potato (all tuber-bearing) and three outgroup non-tuber-bearing members of *Solanum* section *Etuberosum*, genotyped with 438 robust amplified fragment length polymorphisms. Our analyses are consistent with a hypothesis of a “northern” (Peru) and “southern” (Bolivia and Argentina) cladistic split for members of the *S. brevicaulle* complex, and with the need for considerable reduction of species in the complex. In contrast to all prior hypotheses, our data support **a monophyletic origin of the landrace cultivars from the northern component of this complex in Peru**, rather than from multiple independent origins from various northern and southern members.

Spooner et al. (2005) PNAS 102:14694-14699

34



35



36

