New stone fruit rootstocks from the Krymsk Experimental Breeding Station

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Krymsk Experimental Breeding Station

- Krymsk experimental Breeding Station was founded in 1935
- Prof. Gennady Eremin (director station 1974-2007) collected over 10,000 unique *Prunus* genotypes for breeding interspecific rootstocks for stone fruit species (6000 in current collection)
- **Aims of breeding program:**
  - Semi vigorous and dwarfing rootstocks for stone fruits
  - Precocious rootstocks adapted to hot and dry summer conditions
  - Rootstocks tolerant to dry, wet and wet soils, nematodes, pest and diseases

Varieties International – Oregon, USA

- Owns world license to propagate Krymsk rootstocks outside Russia
- Facilitates the patenting and marketing of Krymsk rootstocks outside Russia
- Provides new rootstock selections to nurseries for propagation and testing

Dave Weil
founder & owner

Adam Weil
owner

Mark Holtzinger
general manager

Juan Pablo Ormeno
agronomist

Frank Maas
consultant Europe

nedworc foundation
organisation for independent consultants

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The Krymsk Rootstock Breeding Program

Over period of 60 years Gennady Eremin has collected about 12,000 *Prunus* genotypes. At present about 6000 genotypes left in their collection at Krymsk

Crossing parents Krymsk breeding program

Breeding unique interspecific rootstock genotypes through species crossings

Characteristic	Prunus species
Weak growth	*P. pumila, P. incana, P. tomentosa. P. spinosa, P. nana, P. kurilensis, P. incisa, P. prostrata, P. canescens*
Ease of propagation	*P. cerasifera, P. pumila, P. dasycarpa, P. lannesiana, P. mahaleb, P. pseudocerasus, P. serrulata*
Frost resistance	*P. pumila, P. tomentosa, P. spinosa, P. nana, P. fruticosa, P. sachalinensis, P. kurilensis, P. ulmifolia, P. davidiana*
Drought resistance	*P. nana, P. bucharica, P. spinosissima, P. mahaleb, P. fruticosa, P. spinosa, P. incana, P. armeniaca*
Flooding (asphixia) resistance	*P. cerasifera, P. tomentosa, P. dasycarpa*
Resistance to soil pathogens	*P. cerasifera, P. spinosa, P. tomentosa, P. pumila, P. davidiana, P. fruticosa*

Source: Eremin et al. (2017). Proceedings of the Latvian Academy of Sciences, section B, 71(3), pp.173-177.

Released Krymsk rootstocks and their use for different stone fruit species

Krymsk rootstock	US patent	Used as rootstock for
Krymsk®1 (VVA-1)	USPP 15,955	Almond, apricot, nectarine, peach, plum
Krymsk®2 (VSV-1)	USPP 15,957	Almond, apricot, nectarine, peach, plum
Krymsk®5 (VSL-2)	USPP 15,723	Cherry
Krymsk®6 (LC-52)	USPP 16,114	Cherry
Krymsk®7 (L2)	USPP 14,353	Cherry
Krymsk®86 (Kuban 86)	USPP 16,272	Almond, apricot, nectarine, peach, plum
Krymsk®99 (AP3)	USPP 26,299	Apricot, peach, plum

Krymsk®1 has become the standard rootstock for European plum in The Netherlands

Total plum orchard area NL: 250 ha

Rootstock St. Julien A:	1250 trees/ha
Rootstock Krymsk®1 (VVA-1):	2250 trees/ha

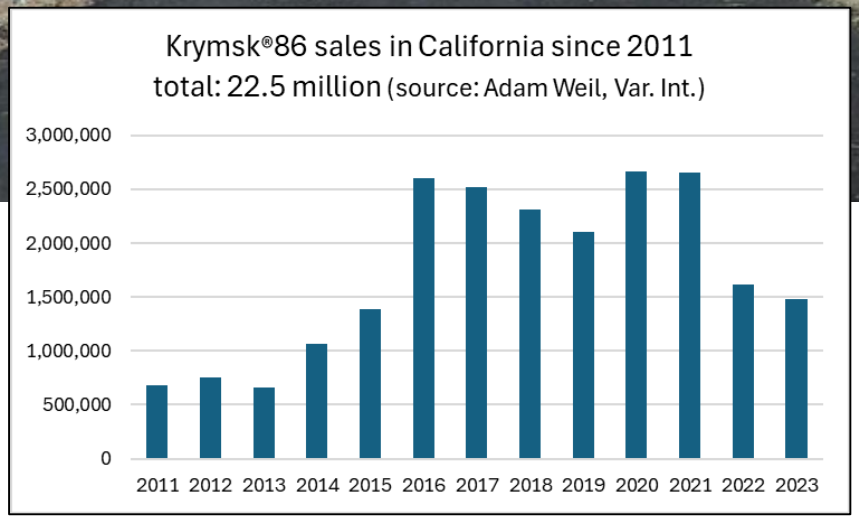
Trees on Krymsk®1 sold since 2002: 322,505

Source: Botden & Van Willegen Nurseries (NL)

High-density 'Jubileum'/ Krymsk®1 plum orchard in 2nd leaf

Photos: Frank Maas, 15-08-2006

Krymsk®86 has become an important rootstock for almond growers in California



Krymsk®86 strengths:

- Outstanding Anchorage
- Productive in Well-drained & Wetter, Heavier Soils
- Strong Yields with Moderate Vigor
- Tolerates Oak Root Fungus

Photo: Fowler nurseries, Inc., USA

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Krymsk®86 tolerates flooding

Effects of a week of flooding followed by 2 weeks of standing water and 5 weeks of muddy soil in an orchard in Chile on 4-year old cherry-plum trees

Massive tree death on rootstock
Nemagard

100% tree survival on rootstock
Krymsk®86

Photos: Adam Weil, Varieties International/Tree Connect, Oregon, USA (January 2024)

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Heat stress trees on Gisela®6 in Turkey

Krymsk rootstocks tolerate heat stress and wet soils

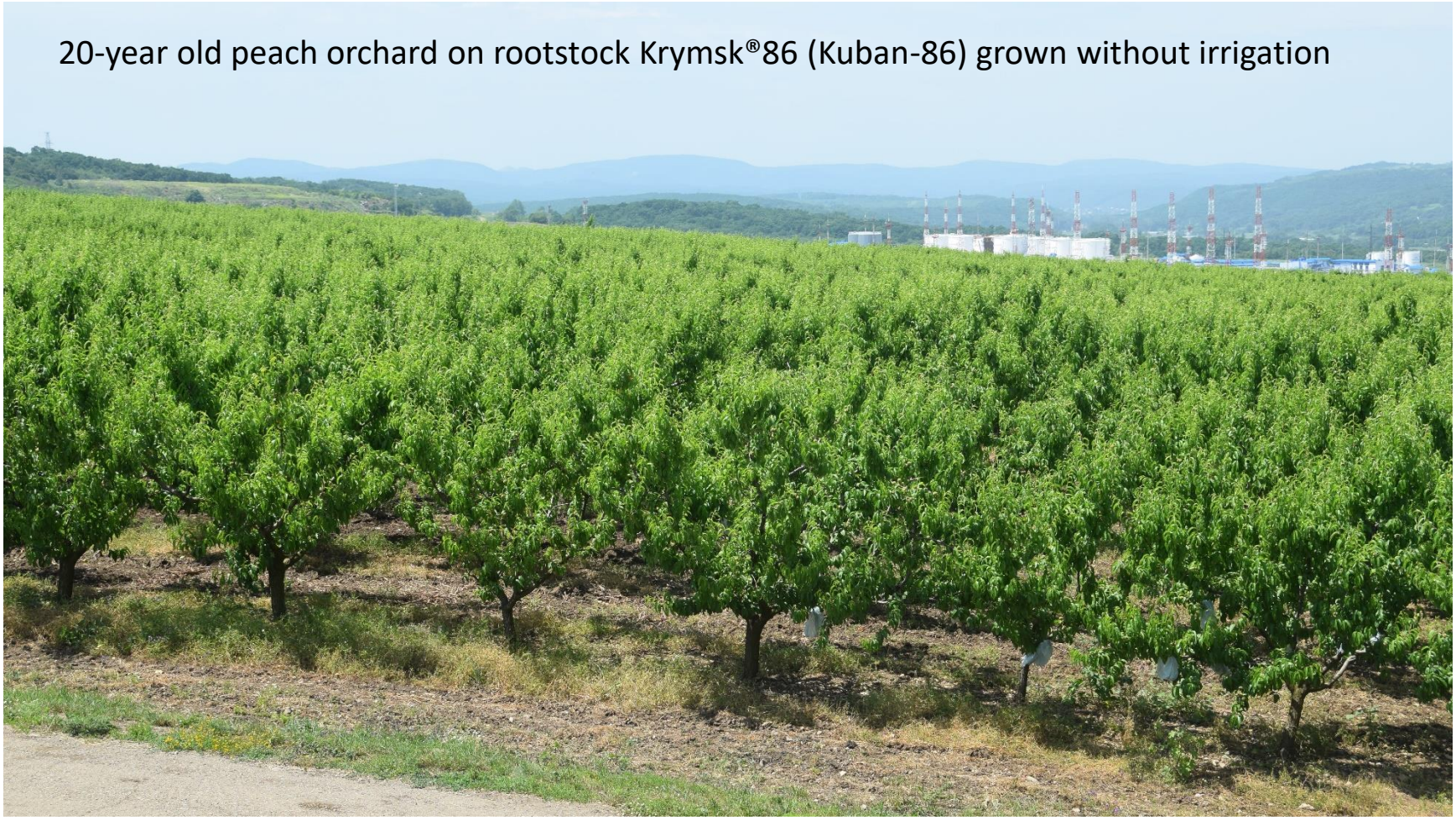
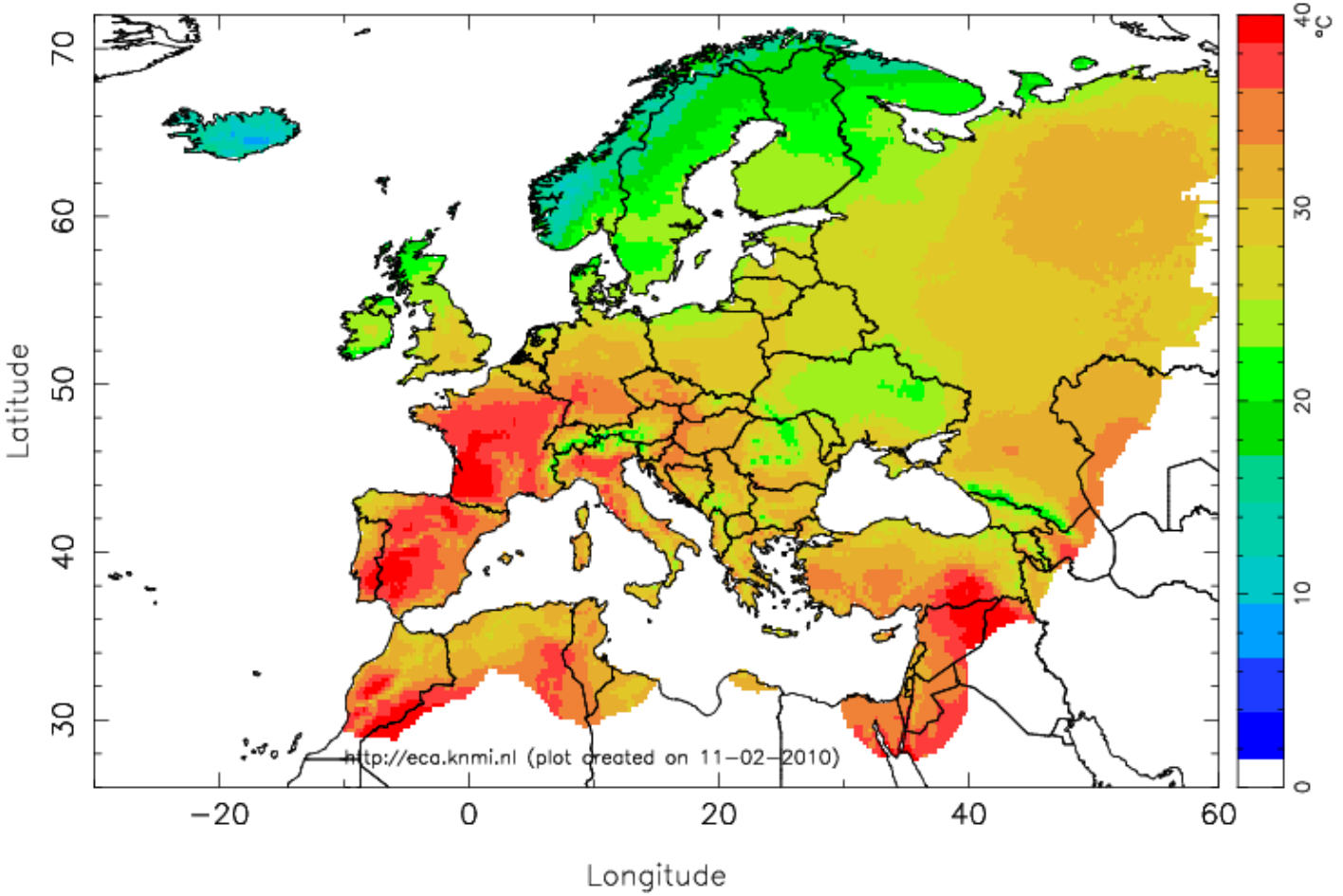


Photo: Frank Maas, Krymsk, June 11, 2019

There is no single rootstock that is suitable for every geographical location and soil type

Maximum temperature in Europe on August 4, 2003



Recently imported Krymsk rootstock selections into Europe for cherry

Name/Code	Prunus parentage	Estimated vigour compared to Mazzard seedling
18-7-17	*P. canescens x P. cerasus*	50 %, smaller than Gisela®5
A-9 x VSL-2	*(P. avium x P. incisa) x (P.fructicosa x P. lannesiana)*	60%
C 56-12 x VSL-2	*(P. cerasus x P. pseudocerasus) x (P. fructicosa x P. lannesiana)*	60%
P. serr. 42-2-16 № 1	*P. serrulata*	70%
P. serr. x P. sach.	*P. serrulata x P. sachalinensis*	60%
P. mah. x P. fruc.	*P. mahaleb x P. fructicosa*	dwarf
Rulan 8	*(P. cerasus x P. maackii) x (P. fructicosa x P. lannesiana)*	50-60%
RVL-4	*(P. maackii x P. cerasus) x P. lannesiana nr. 2*	70%

Source: G. Eremin, Krymsk Experimental Breeding Station

Recently imported Krymsk rootstock selections into Europe for plum/peach/nectarine/apricot/almond

Name/Code	PRUNUS Parentage	Estimated vigour
Achete	*P. spinosa* x *P. cerasifera*	Moderate dwarf
E5	*P. pumila x (P. cerasifera x P. armeniaca)*	Dwarf
Kolibry	*P. cerasifera x P. armeniaca*	Very dwarf
P. pum. x Kuban-86	*Prunus pumila x (P. persica x P. cerasifera)*	Dwarf
Sava	*((P. salicina x P. cerasifera) x P. cerasifera)) x (P. tomentosa x P. cerasifera)*	Dwarf
Trio 22-07	*(P. tomentosa x P. ulmifilia) x P. cerasifera*	Dwarf
Trio 25-07	*(P. tomentosa x P. ulmifilia) x P. cerasifera*	Dwarf
Trio 27-07	*(P. tomentosa x P. ulmifilia) x P. cerasifera*	Dwarf

Source: G. Eremin, Krymsk Experimental Breeding Station

Evaluation of new selections in Krymsk

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Evaluation is also done in Turkey, Chile, USA, Australia and The Netherlands

Tree growth, fruit yield, disease and pest resistance, drought tolerance, etc.

Evaluation of new Krymsk selections in Netherlands

Test plot Botden & Van Willigen Nurseries. ‘Jubileum’ and ‘Opal’ plum on new Krymsk rootstock selections

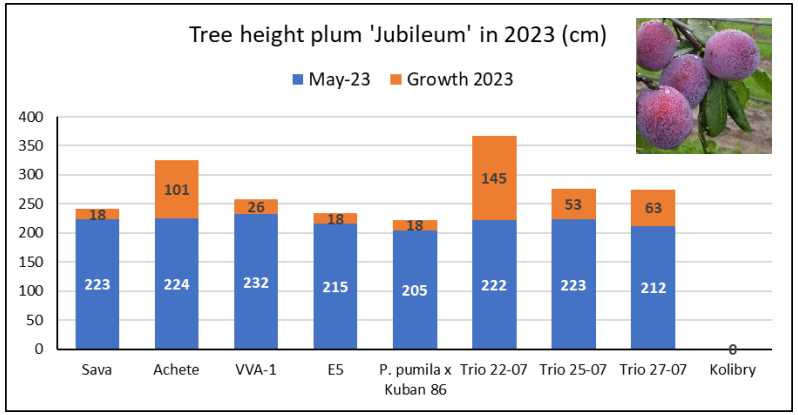

May 25, 2023

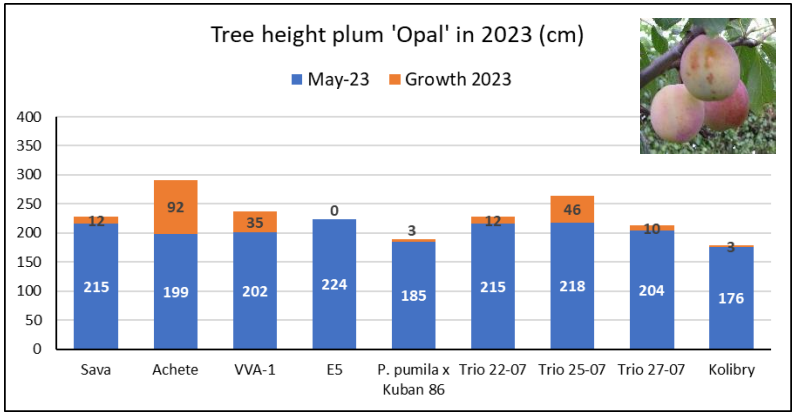

March 25, 2024

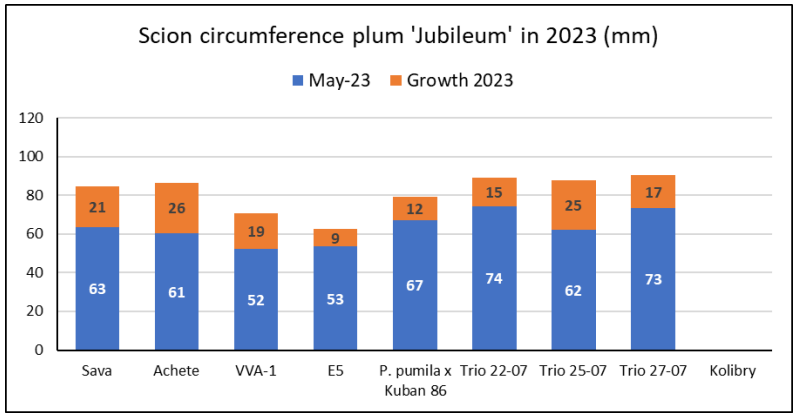

January 30, 2024

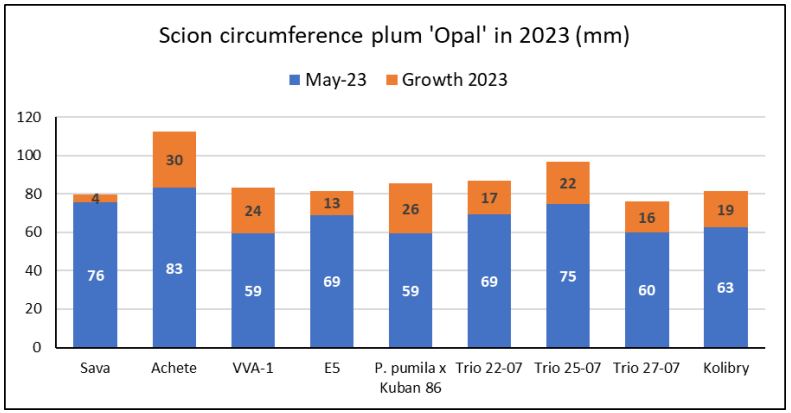
Evaluation of new Krymsk selections in The Netherlands

Tree growth ‘Jubileum’ and ‘Opal’ plum trees on different Krymsk rootstocks in year of planting









Test plot Botden & Van Willigen Nurseries

Evaluation of new selections in Europe

- Will be done in cooperation with group of European Nurseries
- Coordinator and contact person trials in EU on behalve of Varieties Int.

Dr. Frank Maas, The Netherlands
e-mail: frank.maas.nl@gmail.com

Cooperating nurseries in Europe at the moment:

- Battistini (Italy)
- Botden & Van Willigen (Netherlands)
- Cinca group (Spain)
- Fleuren (Netherlands)
- IFO/Dalival (France)

In vitro propagated cherry rootstock 18-7-17 (Battistini nurseries, Italy)

Thanks for your attention

'Lapins' trial on different Krymsk rootstocks in 2nd leaf planted at 5 x 2 m, 1 rootstock type in every 200 m long row (Krymsk Breeding Station, Russia)

Interested in joining Krymsk rootstock testing group Europe?
Contact: frank.maas.nl@gmail.com

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