

## GENETIC RESOURCES MOBILIZATION OF STONE FRUITS IN THE SOUTH OF CENTRAL SIBERIA

T.I DUSKABILOVA, **Candidate of Agriculture**

T. DUSKABILOV, **Candidate of Agriculture**

**The Research Institute of Agrarian Problems of Khakassia,  
Rosselkhozakademy**

*The article presents the estimation of the modern genetic resources of stone fruits in the south of Central Siberia. Newly developed, promising local forms and varieties of apricot Anniversary of Khakassia, Salamatov Memory, variety-stock MGA-1 are adapted to the sharp continental climate. The authors point out micro-zones that are favorable for the stone fruit cultivation.*

**Keywords:** apricot, steppe cherry, selection, micro-zoning, variety, the South of Central Siberia.

Gardening development in the severe conditions of Siberia was determined by the achievements of the scientific and technological progress and is based on a high natural potential of a number of regions [1].

Stone fruits (steppe cherry, apricot) are now quite common in the south of Central Siberia. However, many varieties cultivated in the region are not adapted to the sharp continental climate. They are characterized by instable fruit-bearing and frequent damage because of various abiotic environmental factors.

Studies aimed at the stone fruits preservation and their stable fruit age have been conducted by the Institute since 1996. The scientists have estimated modern genetic resources of stone fruits in different climatic zones of the region, developed promising local forms and varieties adapted to the growing conditions, defined micro-zones that are favorable for their cultivation. In addition, the region historically introduced promising winter-hardy varieties and hybrids of stone fruits developed by research institutes the Urals, the Far East and Western Siberia.

The research is carried out in the Republic of Khakassia and the surrounding areas of Krasnoyarsk territory. The region is in the southern gardening zone of Siberia, which is characterized by a variety of climatic zones (sub-boreal forest and taiga, forest-steppe, steppe) and micro-zones. They are varied from the severe to the most favorable for gardening.

**Research Methods.** The gardens have been surveyed by the route method, while the varieties and promising forms being evaluated according to "The programme and methodology for the study of fruit, berry and nut crops varieties" [2]. Their source potential of the region has been calculated by the method of I.A. Dragavtseva (2004) [3]. The biochemical analysis of the fruit has

been made at the station of the agrochemical service "Khakassia" according to the conventional techniques.

**Results and discussion.** Stone fruits (apricot, plum, steppe cherry) – introducents. Due to the extreme climatic conditions the varieties under tough natural selection, the stone fruits have been mainly propagated with a seed method for a long time. Therefore they have successfully completed the acclimatization and been significantly improved in many ways. This allows the selection of promising local forms.

*Steppe cherry (Cerasus fruticosa (Pall.) G. Woron.)* is the first fruit successfully imported by the exiled Decembrists to Siberia. The steppe cherry is difficult to make selection: its hybrid progeny has rare positive deviations. The winter hardiness and fruit quality have reverse interdependence.

The steppe zone is favorable for the cultivation of varieties with very high winter hardiness of a tree, generative buttons, late blossom, short growing season. The local forms of seed and vegetative origin and cold resistant fruits are widely represented by such varieties as *Altai swallow*, *Subbotinskaya*, *Metelitsa* bred by Lisavenko Horticulture Research Institute of Siberia. The plants bear unregular fruits, with the average yield of 2.3-2.8 kg / a tree [4].

In the forest-steppe zone and gardening micro-zones the climatic conditions allow to cultivate better varieties of hybrid origin with sour cherry – *Flaming*, *Jelannaya*, *Maksimovskaya* and others. The plants produce regular fruits, with the yield of 10-15 kg / a tree.

The study of the local promising forms for the selection has identified sources for some agronomic traits: high adaptability to growing conditions, high yield (up to 17 kg / a tree), the large size of the fruit (the average fruit weight > 4 g).

*Apricot (Armeniaca Scop.)* is traditionally a southern plant. Though the history of its study in Siberia counts for about 100 years, it is a new culture for this region. The apricot got widely spread in the gardens of the southern Central Siberia at the end of the last century.

The apricot population in the Republic of Khakassia is one of the most northern and winter-hard. Here are mainly hardy interspecific hybrids that combine a high frost resistance of *A. siberica* and *A. manchurica*, and the high quality of the fruit of *A. vulgaris*. Moreover, the common *A. manchurica* (about 10%) and *A. siberica* (about 5%) are also grown in the republic. Small quantities of Common apricot are in the most favorable gardening micro-zones.

We share the opinion of Academician G.T. Kazmin that "... the basis of the apricot varieties formation in Eastern Siberia are the hardy "Khabarovsk" varieties of apricot" [5].

The wide dissemination of the apricot in the region coincides with the rise and development of amateur gardening under the gentle slopes of the banks of the rivers Yenisey and Abakan. This is a favorable micro-zone for the apricot cultivation. The snow cover is thin, the air in the summer is dry enough. The apricot does not get rot and is not damaged by fungal diseases to bear fruit almost every year. This has contributed to the rapid spread of an apricot culture

and affirmed the value of mountain and foothill areas for this culture.

For the selection the study has identified sources for some agronomic traits: high resistance to frost (local forms underwent without damage extremely low temperatures in winters 2000-2001., 2005-2006 up to -45° C), high yield (up to 90-120 kg / a tree), the large size of the fruit (the average fruit weight 40-50 g), high adaptability to growing conditions, harmonious fruit taste (sugar-acid ratio 5.9...6.5), high sugar content (up to 9.3%) [6].

Characteristics of promising forms of apricot and steppe cherry.  
The Republic of Khakassia, 2007-12.

Form	Age	Yield, kg / a tree	Fruit weight, g	Ripening period	Trait
<i>Apricot</i>					
Ch-12-09	12	120	12,1	Middle 09	high yield
Ps-16-08	17	90	16,4	Middle 07	
Ch -3-06	6	45	51,5	Middle 08	large fruit
S-1-06	14	60	48,4	Middle 08	
Che-1-07	25	60	26,2	End 07	hardiness
<i>Steppe Cherry</i>					
S-14	12	17	4,3	Middle 08	hardiness, high yield
Sa-10	14	15	4,2	Middle 08	

The most winter-hardy small-fruit forms of apricot are grown in the steppe zone. The apricot buds have early ripeness, so the blossom period often coincides with late spring frosts. This leads to the periodicity of apricot fruit bearing (every 4-5 years).

The Institute has carried out an extensive work to create a collection of stone fruits. Currently the collection includes more than 140 samples. The collection has been formed in two ways: fixing local promising forms and introducing a winter-hardy varieties and hybrids of stone fruits of scientific research institutions of the Far East, the Urals and Western Siberia. There has been also conducted a test of the plum and plum cherry hybrid bred by Siberian Lisavenko Horticulture Research Institute of Siberia; winter hardy plum, cherry plum and apricot hybrids developed by the Central Botanical Garden, plum varieties imported from the highlands of Pamir-Alai.

The top selected forms of the apricot are reproduced, its varieties are comparatively studied. Three varieties are included into the National register of selection achievements permitted for use in the East-Siberian region:

***Anniversary of Khakassia***– a variety has a high resistance to frost and generative buds, maturing in the medium terms, productive (up to 35 kg / a tree), of table use. The fruits are of medium size – 25.6 g, a good presentation and high flavoring qualities.

***SalamatovMemory***– a variety has a high winter hardiness and generative

buds, maturing in the medium terms, productive (up to 25 kg / a tree), of table use. The fruits are of medium size – 27.4 g, a very beautiful presentation, high flavoring qualities. The variety fruit bearing is quick, the tree is undersized. It is valuable for the cultivation according to the intensive technology or for amateur gardening.

**Variety-stock MGA-1** (a complex interspecies hybrid) can help solve the problem of the rootstock for an apricot and plum. Under the conditions of Siberia this problem is very serious. The variety is undersized, having a high winter hardiness of the root system and high regenerative capacity. It increases the graft survival and the yield of standard seedlings by 20-30%, reducing the height of the tree up to 30%. It is compatible with local and European apricot varieties.

In the course of the studies rich genetic resources of stone fruits are found in the region. These are winter-hardy varieties and local forms adapted to the sharp continental climate of the steppe zone as well as high-yielding varieties of a high-quality new generation. The biological potential of stone fruits is shown in full in the defined favorable horticulture micro-zones. This demonstrates a growing possibility of the stone fruits cultivation in the region.

#### **Conclusions:**

- for the selection of the steppe cherry and apricot the sources for some agronomic traits are found: high adaptability, high resistance to low temperatures (in extreme winters the sample trees survived low temperature to -45 ° C without damage), fruit bearing capacity, good taste of fruits (steppe cherry– the yield up to 17 kg / a tree, the average fruit weight > 4 g; apricot – the yield up to 90-120 kg / a tree, the average fruit weight 40-50 g).
- favorable cultivation micro-zones for stone fruits are the gentle slopes of the mountains near large water reservoirs;
- apricot varieties bred by the Institute are recommended for the introduction. *Anniversary of Khakassia* and *Salamatov Memory* are characterized by high resistance to frost, generative buds and wood, high fruit bearing capacity, good taste of fruits. *Variety-stock MGA-1* can be used as a rootstock for an apricot and plum. It has a high hardiness root system and high regeneration ability, improves the yield of standard seedlings by 20-30% and decreases the height of the tree to 30%.

#### REFERENCES

1. Khabarov S.N. Agri-environmental framework technology of improving gardens in Siberia // Problems of sustainable development of Siberian horticulture: scientific and practical materials of the conference devoted to the 70<sup>th</sup> anniversary of Lisavenko RHI. – Barnaul, 2003. – P. 17-32.
2. Program and methods for the research of fruit, berry and nut crops varieties / ed. E.N. Sedov, T.P. Ogoltsova. – Oryol, 1999. – 606 p.

3. Dragavtseva I.A., Kekhaev V.K. Assessment of resource potential for the fruit cultivation in Krasnodarsky territory // Horticulture and viticulture. – 2004. – № 3. – P. 3-7.
4. Duskabilova T.I., Duskabilov T., Muravjev G.A. The cherry in the south of Central Siberia.– Novosibirsk, 2007. – 156 p.
5. Kaz'min G.T. Khabarovsk apricots. – Khabarovsk, 2001. – 92 p.
6. Duskabilov T. Duskabilova T.I., Piskunov E.I. Apricot in the south of Central Siberia. – Novosibirsk, 2004. – 78 p.