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ANALYSIS OF ACCLIMATIZATION FIRE BLIGHT PATHOGEN IN KAZAKHSTAN

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Fire blight – is a dangerous infectious disease caused by the bacteria *Erwinia amylovora* (Burrill) Winslow et al.

Fire blight is originated in North America, and it has spread throughout the world. Currently, the disease is a serious problem in many countries of the world: America, Europe, Asia and Australia.

Fire Blight is considered one of the most serious destructive diseases, infects more than 200 kinds of fruit, ornamental and wild plants of the Rosaceae family (Rosacea) [1-4]. Pear (Pyrinae), apple (Malus), quince (Cedonia) are the most strongly affected by *Erwinia amylovora*, which are considered important both in terms of economic losses, as well as the epidemiological situation in the country.

The causative agent of fire blight of fruit trees is maintained in the winter in infected host plants. Conservation of bacterial mass on a surface and inside of canker is the most important source for infection of plants in the spring.

Bacterial exudate is a causative of the disease, which is released from affected tissues in wet weather as creamy white droplets. The exudate is easily drawn into a thin thread and can be transported over hundreds of kilometers with the help of rain, wind, birds and insects. Particles of exudate, infected pollen fall on the flowers of fruit trees and branches. Under favorable conditions (relative humidity of 70% and an optimum temperature of air 17°C - 28°C) bacteria multiplies rapidly in the flower, moving through the peduncle to fruit spur and branches. In sunlight in drops of exudate bacterium can survive for up to 22 hours, and no light - more than 2 months. After 36-48 hours after wound bacteria can rarely infect the plant, and after 72 hours - can not practically.

The harmfulness of fire blight of fruit trees is very high due to the very rapid proliferation. In heavily infected orchards causative agent of the disease may affect 20 to 50% of trees, of which 2-10% die. In some gardens fire blight affects up to 90% of fruit trees [5].

In Kazakhstan, the first signals of the defeat of the gardens in the southern and south-eastern area of the fruit began to arrive, starting from 2012. Symptoms of bacterial blight are very similar to the manifestation of harmful diseases of fruit - bacterial necrosis causing *Pseudomonas* bacteria genus.

As can be seen from Table 1, in 2012 the area of fire blight foci was only 27 ha, whereas in 2016 it reached almost 980 hectares, most of which are concentrated in Almaty region.

Table 1 – Prevalence of fire blight for fruit crops from 2012 to 2016

Name of the region and the city	Infected, ha				
	2012	2013	2014	2015	2016
Almaty region	27	70	277,1	687,755	901,4347
Zhambyl region	-	1	70	103,7	73,3
South Kazakhstan region	-	-	5,3	5,3	4,9
Almaty city	-	-	-	17,4	0,053
Total	27	71	352,4	813,805	979,6877

*Note: * 3 years data from GI "RMCP and D"*

Due to the plasticity of the pathogen only limiting factor may be greater resistance to it of host plants. However, according to foreign researchers, among the affected crops there isn't absolutely resistant to the pathogen of burn of fruit trees, so the ability of causal agent acclimatization in Kazakhstan is high.

In terms of the southern and southeastern regions of the country, with traditionally developed horticulture are very favorable for acclimatization pathogen *E. amylovora*. This is evidenced by the presence of foci and further expansion of the quarantine facility.

Western Kazakhstan area (Aktobe, Atyrau, West Kazakhstan and part of Kyzylorda regions) is the main consumer, partly industrial horticulture, where they grow mainly central russian, southern varieties.

The northern, eastern and central region of the country, which includes the North Kazakhstan, Kostanay, Akmola, Pavlodar, East Kazakhstan and Karaganda region, area purely consumer gardening (with rare exceptions), where semicultures as ranetki and siberian and altai varieties of apple grown.

Table 2 – The probability of fire blight acclimatization in the territory of the Republic of Kazakhstan [6-20]

№ s/n	Regions	The temperature of January, °C	SET> 17°C	Number of generations
1	Atyrau region	- 2...- 6	3915	It is unlikely, it is possible
2	Almaty region	-7,2...- 15,8	2286	High probability
3	Akmola region	- 6,5... - 14,0	1302	It is unlikely, it is possible
4	Aktobe region	- 8,1... - 19,5	2540	Probably could
5	East Kazakhstan region	-3,6...-13,5	1688	It is unlikely, it is possible
6	West-Kazakhstan region	- 2,3... - 17,6	2730	It is unlikely, it is possible
7	North-Kazakhstan region	-9,2.. -15,1	1388	It is unlikely, it is possible

8	Jambyl Region	- 5...+ 0,5	3105	Perhaps
9	South - Kazakhstan region	- 7,5...+ 6	4264	It is unlikely, it is possible
10	Karaganda region	- 4,5...- 29,5	1527	It is unlikely, it is possible
11	Kostanay region	-8...-16,5	2145	Average probably could
12	Kyzylorda Region	-5...- 14	3767	It is unlikely, it is possible
13	Pavlodar region	-1,5.. -16	2170	It is unlikely, it is possible
14	Mangistau region	-2,5...- 7	3679	It is unlikely, it is possible
<i>Note *3 years of data GI "RMCP and D » *The analysis was performed excluding watering</i>				

In Kazakhstan, the main areas of apple trees cultivation are - south and south-eastern regions - Almaty, South Kazakhstan and Zhambyl regions. Winter, autumn and summer varieties of apples and pears are grown. All stone fruit crops are grown on private farmsteads and cottages in all climatic zones of the country, including the Northern, Western and Eastern regions. An exception is the zone of deserts and semi-deserts of Central Kazakhstan.

There is a particular danger of the *E. amylovora* bacteria in the south-eastern region for Jungar and Trans-Ili Alatau apple forests, a region of origin and genetic diversity of Sievers wild apple. Wildly pear, apricot and plum also grow. There quince is cultivated mainly in South Kazakhstan, Zhambyl regions (Table 2).

Rowan, shadberry, cotoneaster are widely distributed in the northern and eastern regions. Hawthorn grows in the wild in all the mountainous regions of the south, southeast and east of the republic, in the forest-steppe zone of the Northern and Western Kazakhstan. Thus, the host range of a pest in our country is very wide, and they are cultivated on large areas and occur in the wild almost everywhere.

As a result of the qualitative and quantitative assessment of the risk of introduction and further spread of the fire blight pathogen of fruit trees (*Erwinia amylovora*) on the territory of the Republic of Kazakhstan should be considered dangerous quarantine organism for gardens and nurseries in our country that can cause significant economic and environmental damage, as long as he not widely distributed in the Republic of Kazakhstan and has not yet finished its potential habitat.

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