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# Fire blight monitoring of fruit crops in Kazakhstan

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**In Kazakhstan, industrial gardening is concentrated in the Southern and South-eastern regions. The total area of gardens -40 000 hectares, a fruit-bearing age -30 000 ha.**

**About 80% of gardens - located in Almaty and South - Kazakhstan provinces. The climate of this region is favorable for the development of fire blight - *Erwinia amilivora.***

**In 2013, outbreaks of Fire blight identified an area of about 760 hectares.**

# Fire blight outbreaks in Kazakhstan and bordering areas of the Kyrgyz Republic

(Outbreaks are indicated with blue circle)

# Symptoms of fire blight on apple and pear

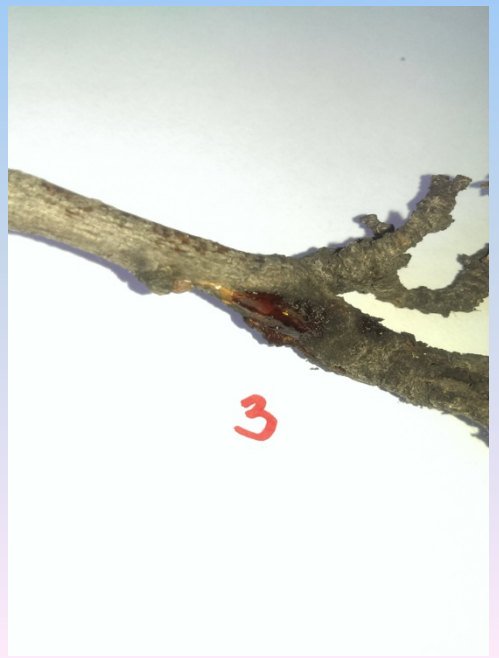
# Samples with fire blight symptoms (flowers, leaves, twigs, fruit, bark).






Young apple shoots affected by fire blight

Wedge-shaped sores on the apple cores




Exudate on the bark of a plum

# The results of the identification of bacteria pathogens isolated from fruit crops in South and South-east Kazakhstan and adjacent territory of Kyrgyzstan

| Regions | Analyzed samples | Allocated isolates | Identified as *E.amylovora* | Identified as *Ps. syringae* | Related microorganisms |
|---|---|---|---|---|---|
| Almaty | 85 | 372 | 185 | 142 | 45 |
| South Kazakhstan | 42 | 190 | 58 | 63 | 69 |
| Zhambyl | 66 | 284 | 71 | 137 | 76 |
| Kyrgystan | 12 | 59 | 34 | 17 | 8 |
| Total | 205 | 905 | 348 | 359 | 198 |

# Results of identify bacterial pathogens isolated from plants of the family Rosaceae

| Culture | Analyzed samples | Allocated isolates | Identified as *E.amylovora* | Identified as *Ps. syringae* | Related microorganisms |
|---|---|---|---|---|---|
| Apple | 102 | 657 | 254 | 240 | 175 |
| Pear | 68 | 166 | 85 | 69 | 22 |
| Quince | 12 | 25 | 12 | 10 | 7 |
| Plum | 11 | 16 | 4 | 7 | 4 |
| Apricot | 9 | 18 | 5 | 7 | 6 |
| Cherry | 3 | 11 | 2 | 4 | 5 |
| Total | 202 | 895 | 360 | 338 | 214 |

**At first, the Isolates tested (screened) for bacterial pathogenicity on plants *Geranium L.***

**Then, subsequent refinement of bacterial pathogen species was performed by White-test on immature pear fruit**

Necrosis (*Ps. syringae*)

Chlorosis (*E. amilovora*)

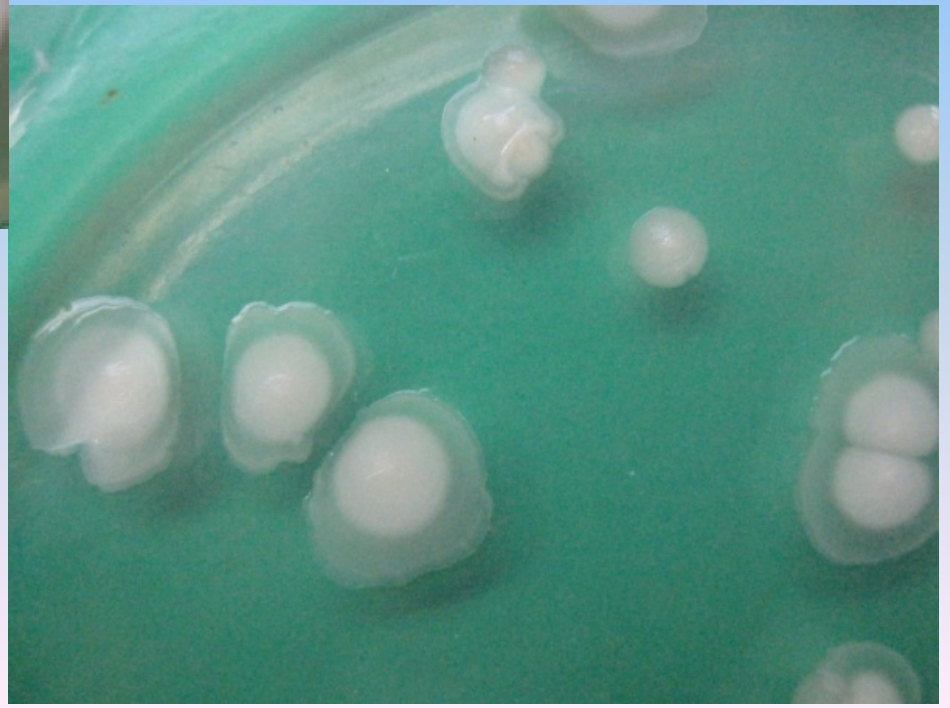
Chlorosis with necrosis (*E. amilovora*)

**Unripe pears infected *E. amylovora* (left) and *Ps. syringae* (right), in the center - control (White test)**

# Exudate on immature pear fruit with artificial infections

# Colony types of *Erwinia amylovora*

Typical compact whole colony



Atypical mucous spreads colonial types

# Import of fruit crops planting material in Kazakhstan (2008-2013 )

| N | Exporting country | Name of regulated products | Quantity (pcs) |
|---|---|---|---|
| | | 2008 | |
| 1 | France | Seedlings, cuttings of fruit crops | 6600 |
| | | 2009 | |
| 3 | Russia | Seedlings, cuttings of fruit crops | 200 |
| 5 | Japan | Seedlings cherry Sakura | 2500 |
| | | 2010 | |
| 6 | USA | Apple rootstock | 40000 |
| 7 | Russia | Seedlings of apple, pear | 3000 |
| 8 | Belgium, | Seedlings of apple varieties Royalty | 1800 |
| 9 | Germany | Seedlings of apple varieties Topaz | 3000 |
| | | 2011 | |
| 10 | Uzbekistan | Seedlings of apple, pear | 10000 |
| 11 | USA | Seedlings and rootstocks of apple | 2200 |
| 12 | Russia | Seedlings of apple, pear | 2000 |
| | | 2012 | |
| 13 | Uzbekistan | Seedlings of fruit crops | 20400 |
| 14 | Poland | Seedlings of fruit crops (apple, pear, cherry) | 31250 |
| 15 | the Netherlands, | Seedlings of fruit crops (apple, pear, cherry) | 1300 |
| | | 2013 | |
| 16 | Uzbekistan | Seedlings of fruit crops (apple, pear, quince) | 250000 |
| 17 | Germany | Seedlings of fruit crops (apple, pear) | 8300 |
| 18 | Italy | Seedlings of fruit crops (apple, pear, cherry, quince) | 64300 |
| 19 | Belgium | Seedlings of fruit crops (apple, pear) | 15000 |

In 2013, monitoring was conducted foothill and mountain areas of Trans-Ili Alatau (near Almaty, where there are gardens in the vicinity of cultural and mixed with wild fruit crops of the family Rosaceae - apple, hawthorn, barberry, mountain ash, apricot.

From all of these plants were collected samples with symptoms of fire blight and necrosis, of which allocated more than 200 isolates.

At the present time we continue the study of their culture-morphological features.