

Importance of Microscopic Diagnosing of Viruses in Initial Material of Seed Potatoes

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Abstract

Importance of microscopic diagnosing of viruses in initial material of seed potatoes. The article describes theoretical and practical importance of microscopic diagnostics of viruses in initial material (seed potato and seedling), the rate of contracting infection and survival rate of planted material. View is derived on the importance of Microscopic Diagnostics on initial material before planting in ground. Data has been given on the durability of potatoes of different sorts against different types of viruses, and on the productivity.

Keywords: seed potatoes, seedling, solonin, survival rate, rate of contracting infection, microscopic diagnostics, meristem

1. Introduction

Production of improved seeds of initial material has been developing for more than sixty years. Different materials have been collected during this period, and they confirm the high effectiveness of production of the initial material i.e. seed potatoes.

The system of improvement of initial material is based on three main methods: multiplication of plant by apical meristem, microscopic diagnosing of viruses and micro multiplication of the material.

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Two disadvantages were noticed in the process of using meristem method in multiplication: firstly, it predicts factual rejection of selecting clones according to their economic values, including productivity; secondly, when growing in sterile conditions, the plant fully loses its immunity against viruses and other illnesses. In the cause of it, virusless potato growing without isolation from affected plants will get infected, and in the third-fourth year of production the plant will get infected more than the initial material. In using the meristem way of multiplication requires much time and the probability of secondary infection of plants by virus increases.

According to available data, elite quality initial materials grown meristem method has hidden infection by viruses from 40% to 60%, i.e. it cannot be considered as virusless. In multiplication of meristem material with the sort of Temp, received from potato planting Scientific Research Institute in Belorussia, using clone selection and serologic valuation of clones, already the third year the rate of infection with viruses constituted upto 90% [1]. These observations confirm the conclusion that the method of apical meristem is practically ineffective and there is a need for new ways of protecting potatoes from virus affection.

We suppose, before multiplying potatoes in abovementioned way it is necessary to carry out curious analysis on initial material in electronically microscopic method.

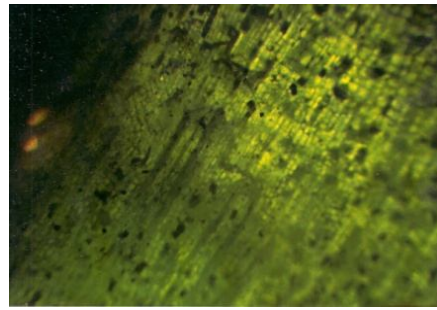
2. Materials and Methods

During 2000-2013 analysis were carried out in order to determine the value rates of improved seeds and infected seeds in Sadvig method in the laboratory of the scientific system of producing cemens of potatoes and vegetables [2]. The researches were carried out on seed potatoes and potato plants of the sort of Yunion, Santa, Romano and Ikar, which had been analysed several times with the help of Electronic Microscope.

Before planting these sorts, juices were extracted from their seeds. The analysis on extracted juices showed that they had the viruses of x, z, s, y, m and the affection rate was **upto 25-30%**. In vegetative period intensive infection of plants (Picture 1,3) marked and thinned. Negative factor acted to lower the yield of potatoes. (10-15 tonn/ ha). Picture (2, 4)



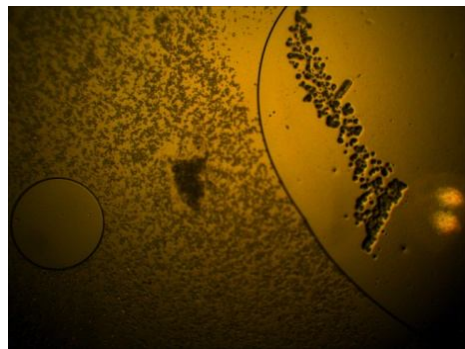
Picture-1.



Picture-2.



Picture-3.



Picture-4.

Additionally, according to the analysis, the juices taken from the plants of above mentioned sorts had viruses of x, m, z and a, and the affection rate was upto 10% [3].

Moreover, availability of glucosids such as solonin in seed potatoes and the potato plants of these sorts were defined. According to our observations and based on other sources there is 30-40 times more solonin in plants than in seeds, and plants have upto 720mg% of solonin.

3. Numerical Results and Discussion

Based on the pursued researches, per hectare quantity of plants in vegetation process was determined.

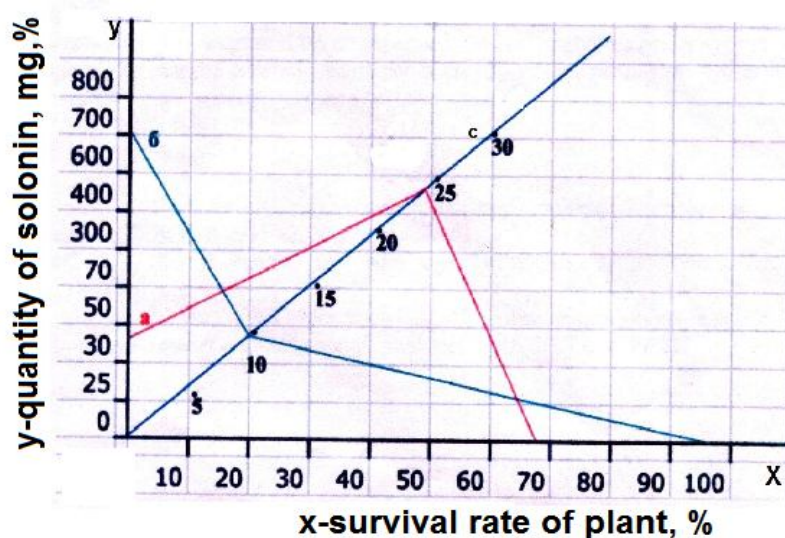
It showed the survival rate of the sorts of Yunior, Sante and Romano constituted 63-68%, and of the survival rate of the sorts of Ikar which were grown virusless was 84%. And this figure was 93-96% for all sorts of plants which were grown from plants i.e. not from seeds. (table1).

Table.1: Quantity of solonin in the content of juices of seed potatoes and potato plants and its effect on the rate of survival and contracting infection. Period (2000-2013)

№	Sorts	Versions	Q-ty of solonin mg,%	Type of viruses in juice	Rate of contracting infection	Survival rate of plants	
							pcs
1	Yunior	Seed potatoes	29	x,s,z,y	30	63	45
		Potato plants	420	x,m	10	93	66
2	Sante	Seed potatoes	35	s,m,z,x	27	66	47
		Potato plants	610	x,z	7	96	68
3	Romano	Seed potatoes	30	m,x,s,z,y	25	68	48
		Potato plants	500	a,x	5	96	68
4	Ikar	Seed potatoes	65	a,x	2	84	60
		Potato plants	720	-	-	96	68

The results of researches state that the availability of glucosids such as solonin at higher rate in the content of plant cells positively affect the survival rate and the productivity of potato plants. It is known that the availability of glucosids such as solonin, amigdaline, sinigrin, and others in the plant increases the plant's durability against external factors and phitopotagen microorganisms. (Diagramm 1).

Diagramm 1. Quantity of solonin in juice cells of reproductive parts of potatoes and its effect on survival rate and on the durability against phitopatogen organisms



(a-quantity of solonin in seed potatoes; b-quantity of solonin in plant; c-rate of contracting infection)

Conclusion

In order to test this theory several researches have been carried out to grow potatoes from seeds and from plants. Date of planting March 10, and the scheme 70x20sqm. During the research the survival rate of plants, the number of seed potatoes, its weight and fruitfulness in all sorts were observed.

The research results showed that the survival rate of the plants that were planted from seed was as follows: Ikar -55%, Sante-50%, Yunior-45% and Romano-50%. And these are rates for plants grown directly from seedling: Ikar-69%, Sante-68%, Yunior-65% and Romano-67%, i.e. they were 14%-18% higher than seed planting. The survival rates for all sorts of plants affect their productivity. It was defined that the fluctuation of productivity in seed planting version was between 15.0-17.5 tonn/ha, and in seedling planting version it was between 18.8-28.0 tonn/ha.

Stemming from all, it can be concluded that in producing seed potatoes it is important to determine and diagnose virus types in initial materials before planting. Availability of solonin at higher rate in plant cells increases plants' durability against infections.

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