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SCIENTIFIC HYPOTHESIS "VARIETY AND POPULATION IN AGROBIOCENOSIS OF POTATOES"

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Abstract
The results of studies on the formation of agrobiocenosis of potatoes, based on the study of the biological characteristics of some varieties, soil and climatic conditions, and crop cultivation technology, are presented. The scientific hypothesis about the likelihood of the formation of new strains of pathogens when combining biocenoses is also substantiated.
It was discussed on formation of agrobiocenoses, based on biological pecualirities of varieties of potato, soil-climatic conditions and production technology of crop. It was Scientifically prouved hopoteses on relativity of formation of new strains, cousing different problems at mixed biocenoses.

Keywords: Potato, viruses, varieties, agrobiocenosis, recombination, infectious background, harmfulness of viruses, etc.

Introduction

Virus resistance of a variety is of great importance in seed production of potatoes on a non-virus basis, since the biological characteristics of each variety in relation to a single virus and their complex, the ability of plants to resist pathogenicity determines the success of protective measures aimed at preserving a healthy source material from re-viral re-infection. However, under the same conditions, there is the possibility of the emergence of new strains of viruses that can overwhelm a resistant variety. Therefore, the study of the possible species-forming processes of pathogens in each agrobiocenosis, varieties and when they are shifted in collection nurseries is of great theoretical and practical importance.

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Literature review:

The biological characteristics of each variety in terms of resistance to individual viruses and their complex determines the ability of plants to withstand pathogens, and it, in turn, determines the success of protective measures in the safe potato seed production, aimed at preserving the healthy raw material from the seed.

Therefore, K.V. Kurets and E.G. Popov (1988) believe that the requirements of the genotype to environmental conditions are aimed at determining the boundaries for which cultivation of varieties is rational (assessing the adaptability of the genotype), as well as identifying that combination of external factors, for which cultivation of a variety is most effective (optimization of the medium for the genotype).

I. D. Shapiro (1985) believes that the sowing of each variety is a special ecological system that creates, as a result of cultivation, unique conditions for the habitat and development of the mesofauna. There is evidence from medical scientists regarding human and animal viruses that they are capable of mutating. Mutations occur in each generation and serve for the viral population as a constant source of hereditary variability (Ya.Ya. Tsilinsky, 1998), the result of which is the formation of new pathogens. Obviously, the probability of the sudden appearance of new viruses, characterized by an increased genome size and an unusual way of reproduction, is extremely low.

At the same time, under favorable conditions, the evolution of already existing viruses takes place, which may result in the emergence of new pathogen strains with increased epidemic potential, including in potato agrobiocenosis. So, R.A. Robinson (1976), although it does not indicate the source of the emergence of new strains, it does not reject the possibility of the formation of new plant pathogens and notes that a new parasite race may afflict a stable variety.

Object research methodology:

The objects of research are the potato varieties Nevsky, Kuvonch-1656 m, Detskoselsky and Sante. The apparent infection of potato plants with viral diseases is determined by the visual method, and their latent normality with viruses X, S, M, and Y is not based on serological analyzes according to the “guidelines for serological diagnosis of virus and bacteria potato-borne potatoes” (Moscow, 1972)

Research results:

The above material and data from our own research on the genetic characteristics of potato varieties in relation to individual viruses formed the basis for creating the hypothesis "Variety and population of viruses in potato agrobiocenosis", the essence of which is as follows: Plants of each variety have a different degree of resistance to individual viruses. So, in the potato varieties Nevsky and Kuvonch-1656 m, resistance to viruses X and M prevails over resistance to viruses S and Y. The smallest number of plants - carriers of virus S are noted in the Ramon variety. Variety Sante proved to be resistant to viruses L and Y. Plants of the Detskoselsky variety, which turned out to be very susceptible to virus S, exert the same ability to virus X.

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The data obtained allow us to conclude that the cultivation of each variety creates a specific agrobiocenosis of potatoes, including a population of viruses in the biocenosis, which is characteristic, according to the biological characteristics of each of them, and in the process of reproduction of which creates its own "infectious background".

This agrobiocenosis is formed under certain soil and climatic conditions, i.e. under the influence of external conditions, and therefore consider this process in isolation from the external environment is not logical. However, under equal conditions, the differences in assortment agrobiocenoses follow from the biological characteristics of each variety.

Based on the possible mutation and recombination of virus RNA, it is possible to predict the formation of new strains of parasites and to assume that cultivation of several varieties in one field or next to each other will lead to an increase in the process of the appearance of new races in the pathogen population that can destroy plants of another variety that have a certain genotype tolerance to this pathogen is laid. In our experiments, plants of the Nevsky variety were to some extent resistant to the X virus, but susceptible to the L virus, and the Sante variety was less affected by the Y and L. viruses.

Therefore, as we suggest, cultivation of these varieties in one place can accelerate the emergence of new strains of viruses X, Y and L, capable of affecting both varieties. For clarity, we make these judgments in a schematic order, where populations of viruses in agrobiocenosis are conventionally indicated by the letters A and B.

It can be seen from Fig. 2 that a new race of virus Y that may have arisen as a result of mutation and recombination of RNA in the population of viruses of the agrobiocenosis of variety B can damage plants of another, adjacent to the field of variety A, which was resistant to strains U and Y0 of the same virus.

In this case, the possibility of the appearance of new strains of pathogens within the agrobiocenosis of the same variety is not ruled out. However, under conditions causing speciation and based on the biological characteristics of the variety's resistance to the parasite, we assume that the probability of the formation of new races and strains decreases in a medium resistant to other strains of the same pathogen.

From this we can conclude that when combining agrobiocenoses even without the formation of new species or pathogen strains, the size of the damage caused by viruses grows in comparison with the damage caused by pathogens within each biocenosis.

These considerations served as the basis for us to put forward the following hypothesis: Each variety, based on biological characteristics, in the place of cultivation creates its own "infectious background" of viruses in the agrobiocenosis. When several varieties are grown together, they are displaced and pathogen populations are formed with possible processes of formation of new strains of pathogens.

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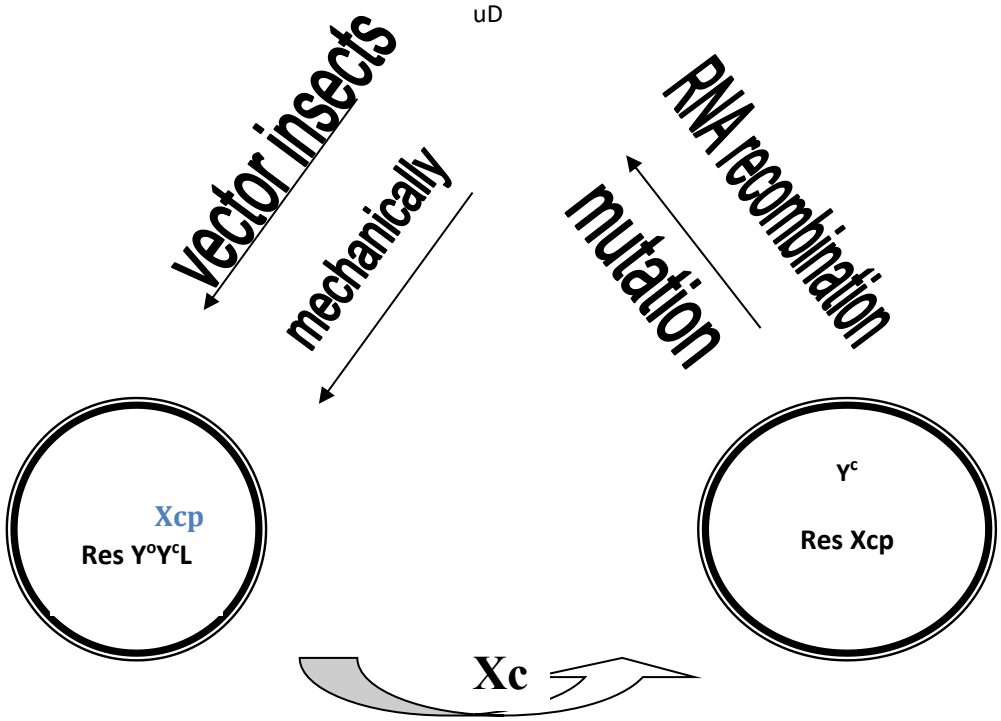


FIG. Potato Virus Population in Variety Agrobiocenosis

According to fig.

Qu (a) <Qu [☐ (a + c)] or
Qu (c) <Qu [☐ (a + c)]
Here Kv is the coefficient of damage to viruses
a - agrobiocenosis of grade A
c - variety B agrobiocenosis
or in general
Sq (N) <Sq (N + n ...)
N - agrobiocenosis of one variety
n - agrobiocenosis of other varieties, etc.

Even in the absence of factors causing neoplasms when agrobiocenoses are combined, the probability of the spread of pathogens increases and, accordingly, the size of the damage caused by pathogens increases. The magnitude of this harm will always be greater with the joint cultivation of varieties compared to one agrobiocenosis.

Thus, for each particular region, appropriate varieties should be selected, based on soil and climatic conditions and biological characteristics of varieties. In addition, for the mountainous and sub-mountainous zones of Uzbekistan, characterized by a low number of aphid-carrying viruses, the resistance of the variety to entomopathogenic viruses is not of particular importance, and for the flat zone with the largest number of aphids, the

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selected varieties must be resistant to viraeus. However, for all areas of the republic, one of the criteria for evaluating the process of cultivating a variety should be resistance to viruses transmitted by mechanical means.

In potato-free seedless cultivation and in order to preserve healthy plants from intensive virulence and to reduce the “infectious background” of pathogens, the concentration of a large number of varieties in primary seed nurseries is undesirable. And also, we consider the laying of primary seed nurseries near collection nurseries inappropriate.

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