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STUDY COLLECTION POTATO VARIETIES FOR RESISTANCE TO VIRAL DISEASES

The aim of the study was to investigate the collection of potato varieties in the southern part of Forest-steppe Ukraine and selection of samples resistant to viral diseases for further nd use in breeding work. The starting material was a collection of potato collection Ustimovka Experimental Station of Plant in the amount of 625 samples from 32 countries and abroad. For the biological status of the collection is represented by varieties. During research, it was found that the visual assessment of disease may be complicated due to some nonspecific symptoms that are similar to the symptoms of fungal and bacterial diseases of plants. Therefore, as a significant addition to the visual diagnosis of varieties has been used a wide range of virological methods for identification of viruses, which was carried out in the Laboratory of Ecology of viruses and viral diseases diagnosis "Institute of BioIogy" of the Taras Shevchenko Kyiv National University. Results virusologiche-ray studies confirmed the presence of viruses in infected plants. In the results, the study highlighted Tate samples that are recommended for further inclusion in the selection process: resistance to *Potato leaf roll virus L* – Кристал (Russia); Ada, Bzura (Poland); Sprint, Aguila, Roxy, Shwalbe, Tempora, Turbella, Apta, Kardula (Germany); Iskra, Galina (Czech Republic); Jaerla, Sante, Grata, Kardinal, Bintij, Ostara, Debora, Resy (Niderlany); resistant to mosaic virus wrinkly *Potato virus Y* + *Potato virus* X, *Potato virus* S, *Potato virus* A, *Potato virus M* – Kardula, Pamir (Germa-tion); Iskra, Galina (Czech Republic); Magura (Romania); Igor (Yugoslavia); Marijke, Desiree, Ostara, Debora, Radosa, Resy (Netherlands) and banded mosaic *Potato virus Y* – Perspective (Ukraine); Ada (Paul-sha); Sprint, Apta, Agwila, Augusta, Carla, Eros, Grata, Lori, Luna, Oda, Ponta, Shwalbe, Feldeslohn (Germany); Desiree, Ostara, Radoza, Saturna (Netherlands); Electre (Belgium); Maritta (France). These varieties are recommended for future inclusion in the selection process.

Key words: *potato virus diseases, viruses, soil and climatic conditions, visual diagnostics*

INTRODUCTION

Resistance to potato virus diseases is of paramount importance for the cultivation of culture, since viruses are transmitted together with the planting material and cause high yield losses – up to 15-70% [1]. Control of viral infections in the tenements-kah cultivated plants using their natural resistance to pathogens – an urgent task for the breeding, as it is the ideal decision for the problem of protection of Ras plants and environmentally safe for the environment, a method of

growing agri-agricultural crops. Therefore, the search for sources of resistance to viral infections should be given special attention.

Until the early twentieth century, curl, wavy and wrinkled potato leaves treated only as a manifestation of "degeneration" or aging plants, because the available methods was impossible to identify the pathogen that causes these diseases. The impetus for the elucidation of the nature of "degeneration" of potatoes was the discovery by Russian scientist D.I. Ivanovskij in 1892 in the juice of tobacco plants with symptoms of mosaic disease-start completely new species, now known as the "virus".

The discoveries of Professor D.I. Ivanovskij are of exceptional importance for the potato cultivation. Successful control of viral diseases of potato is only possible result of the re-application of the system of measures, the important role that belongs breeding and seed production [2]. Creating varieties resistant to various pathogens is not possible without knowledge and confidence to establish the properties of these pathogens.

The distribution and severity of viral diseases of potato in different climatic zones studied since the early 20-th and by the end of the 50-th of the last century, it was found that their value increases from the northern to the southern and southeastern regions, i.e. from the climatic zones with a cool climate and sufficient wetting to areas of high summer temperatures and insufficient or irregular rainfall [3]. Also found that the species *S. tuberosum, ssp andigena,* which in the pedigree of many modern varieties resistant to *Potato virus Y (PVY)* controlling the two genes: Ry*adg,* which is responsible for the stability of potato plants and Ny*adg,* counter-lating reaction hypersensitivity [4, 5]. In addition, global changes in climate that affect plant growth and development, put forward the problem of stability of the complex varieties to adverse conditions. Thus, the promise research of resistant to virus diseases of potato varieties, taking into account areas of cultivation, the search of sources of plants potato resistance to both biotic and abiotiche-skim factors, as well as a comprehensive study of viruses infecting potatoes in the soil-climatic zone. The goal of the study was to investigate the collection of potato varieties and selection of samples resistant to viral diseases for future them use in breeding.

MATERIALS, CONDITIONS AND RESEARCH METHODS

Studies conducted on Ustimovka Experimental Station of Plant Prodaction Plant Prodaction Institute nd. a. V.Y. Yuriev National Academy of Agrarian Sciences of Ukraine and the National Taras Shevchenko University during the 2011-2013. Materials for the study was the collection of potato of Ustimovka Experimental Station of Plant in the amount of 625 samples from 32 countries and abroad. On the biological status of the collection is represented by varieties. The study of collection material held under natural infectious background in accordance with generally accepted methods in potato cultivation [6-9]. Resistant varieties were evaluated on a 9-point scale sustainability: 1 - min, 9 - max of onset.

Hydrothermal coefficient to assess the conditions of vegetation was calculated by [10]. Classification was carried on according to conditions of moistening Selyaninov G.T.: wet – 1,6-1,3; weakly arid – 1,3-1,0; arid – 1,0-0,7; very dry – 0,7-0,4; dry – <0,4.

Characterization of the climatic conditions in the years of research carried out on the basis of data meteoposta Ustimovka Experiment Station crop.

In order to determine the influence of external conditions on the nature of the development and spread of viral diseases was calculated hydrothermal coefficient during the vegetation period 2011-2013 (T ab. 1).

According to table 1, the arid environmental conditions prevailed in the area of the Southern part of the forest-steppe of Ukraine, which created a favorable background for the development of virus disease, except in June and July 2011. Accordingly, in these months there was excessive rainfall. In June, 195,5 mm of rainfall observed during long-term average of 57,0 mm. Average monthly air temperature was + 21,8 ° C at historical averages + 19,5 ° C. In July, in the first ten days of the month for the 5 days of rain fell 155,3 mm of rain, with an average annual temperature of 72,0 mm.

Table 1

Hydrothermal coefficient of the growing season potatoes, 2011-2013

Years	Months			
	May	June	July	August
2011	0,4	3,0	2,4	0,2
2012	0,7	0,3	1,1	0,4
2013	0,3	0,3	0,6	0,6

In the first stage of studying the stability of potato varieties to virus diseases carried on a visual diagnosis, is the most simple and universal method. The task was the selection the selection of plants affected by viruses and determination of disease due to abnormalities that can be observed with the naked eye on the plants and tubers.

Phenotypic expression of viral infection have leaf rolling of plants. The character of development and spread of viral diseases of potato determined by biological and genetic characteristics of varieties. The work on the allocation of potato accessions with high field resistance to the most common and harmful viruses in the natural-climatic zone has carried on:

– viral leaf rolling (the causative agent of the disease *virus L, Potato leaf roll virus*);

– wrinkled mosaic (the causative agent of the disease *Potato virus Y* in different combinations with the *virus Potato, virus X, Potato virus S, Potato virus A, Potato virus M*, rarer mo-noinfection *PVY*);

– banded mosaic (the causative agent of the disease – *Potato virus Y*).

Varieties that are in the field of visual assessment were identified as resistant to viral diseases, were tested for the content of viral infection using co-temporal methods of virology. Virus isolation and purification of virus preparations, establishing physical imunnological and molecular biological properties of the virus, as well as electron microscopy studies were carried out in the Laboratory of Viruses ecology and viral diseases diagnosis "Institute of Biology" Taras Shevchenko Kyiv National University. The morphology of the virus particles was studied by electron microscopy. Negative staining of purified virus preparations were performed by 2,0% sol-phosphotungstic acid during 2 minutes [11]. Preparations research-whether using electronic microscopes JEM 1230 (JEOL, Japan) and EM-125 (Sumy, Ukaine). Identification of the virus was carried out by solid-phase enzyme immunoassay-analysis (sandwich version) using commercial test systems LOEWE, Germany. The reaction results were recorded on a plate reader Termo Labsystems Opsis MR (US) from the software Dunex Revelation Quicklink at wavelengths of 405/630 nm. Reliable take values which exceed the negative control tripled [12].

RESULTS AND DISCUSSION

Based on the fact that the experimental station is located in the central part of the Left Bank Ukraine-tion on the border between the forest steppe and steppe zones in the southeastern part of the Poltava area, a significant influence on the intensity of the virus-bolez it have weather conditions. As a result of our research would lo found that an important factor in reducing the potato crop is environmental depression, and loss of plants and tubers of viral diseases. Also Set-Leno that harmfulness of these factors increases with the north to the south of Ukraine.

As a result of our research, it was found that the intensive development of the banded mosaic contributes insufficient supply moisture to the plants due to high temperatures. During moderate wet weather noted that Zabolev-set is less common. The main symptom of defeat was banded mosaic necrosis of leaves and stems. The disease manifests itself first in the young plants in a mo-stutterer, and later (during budding) - dark necrosis along the veins on the lower side of the sheet, on petioles, sometimes on the stems of plants (Fig. 1).

Fig.1. **Symptoms banded mosaic on potato cultivar Bil'in (Ukraine), 2013.**

Petioles from infected plants become brittle, dry out, but not moved time. Began with the withering away of the lower leaves, the green is just the tip. There are instances when the tubers are formed necrosis. Infected plants were stunted and sometimes even died before flowering. We noted that the banded mosaic is often combined with wrinkled mosaics. Y- potato virus in co-combination with other potato viruses such as A, X, S, M, is harmful for the disease, sometimes resulting in considerable loss of yield (70%) [13]. The effect of the combined action of pathogens depends on a combination of virus and potato varietal characteristics.

Pathogen banded mosaic virus Potato Y- (PVY) is common in all areas of potato cultivation. On most varieties, which have been studied, a noticeable symptoms. According to the visual inspection possible to select the varieties with resistance response 7,5-8,5 points: Angle (Ukraine); Ada (Poland); Sprint, Apta, Agwila, Augusta, Carla, Eros, Grata, Lori, Luna, Oda, Ponta, Shwalbe, Feldeslohn (Germany); Desiree, Ostara, Radoza, Saturna (Netherlands); Electre (Belgium); Maritta (Fran-tion) (Tab. 2).

A study of the economic characteristics of the varieties as sources of producing capacity were identified: Desiree (1000 g / bush), Ponta (960 g / bush), Feldeslohn (900 g / bush); according to the amount of marketable tubers, 1 bush varieties vydelelis Feldeslohn (12,5 pcs.), Carla, Oda (11,6 pcs.), Ponta (11,1 pcs.). As a result, estimates of the average weight of the tuber as krupnoklubne-st grade separated Desiree (100,7 g).

It is known that in recent years has created varieties have only a relative or field resistance to leaf roll virus, the causative agent of the disease - the virus twisted-tion of potato leaves (PLRV). The genetic nature of such resistance is due to polygenic complex that gives an opportunity to increase the resistance of potato against disease by producing transgressions. Sequential mating three or four stable forms can be obtained offspring with high resistance against leaf curl virus. Symptoms of the disease depend on the strain of potato varieties, environmental conditions, but they are basically the same type enough (Fig. 2).

The difference between them is caused by a primary or secondary viral infection. Germination of infected tubers delayed. They observed the formation of filamentous sprouts.

As a result of studies in the field have been isolated from the varieties with respect to, and high resistance (7-8.5 points) against leaf curl: Crystal (Russia); Ada, Bzura (Poland); Sprint, Aguila, Roxy, Shwalbe, Tempora, Turbella, Apta, Kar-dula (Germany); Iskra, Galina (Czech Republic); Jaerla, Sante, Grata, Kardinal, Bintij, Ostara, Debora, Resy (Niderlany) (Tab. 3).

A study of how highly allocated: Crystal (1100 g / bush), Sante (1090 g / bush), Kardinal (1000 g / bush), Jaerla (980 g / bush), Turbella (900 g / bush); as mnogoklubnevye vydelelis grades: Resy (11,0 pcs.), Sante (10,4 pcs.), Kardinal (10,0 pcs.). On average tuber weight as krupnoklubnevy allocated grades: Crystal (99,0 g), Tempora (97,1 g), Ostara (90,0).

Table 2

Resistance to banded mosaic and basic household characteristics of the resistant potato varieties, 2011-2013

Variety	Resistance to *Potato virus Y, p*	Yield, g /bush	Total number of tubers from one bush, pcs	Number of marketable tubers from one bush, pcs	The average tuber weigh, g	Weight of market. tuber, g
Carla	8,5	790	14,5	11,6	43,6	54,5
Apta	8,5	620	8,3	7,0	62,5	74,4
Shwalbe	8,5	637	10,2	8,3	51,1	62,6
Agwila	8,5	790	9,0	7,3	70,4	87,3
Ракурс	8,0	660	7,6	6,4	72,8	86,6
Ponta	8,0	960	13,2	11,1	61,0	72,6
Ostara	8,0	480	4,2	3,3	89,9	114,3
Desiree	8,0	1000	8,4	7,1	100,7	119,1
Ada	8,0	577	10,1	8,5	48,1	57,1
Sprint	8,0	500	7,2	6,0	57,8	69,4
Maritta	8,0	590	10,5	8	43,1	56,4
Feldeslohn	8,0	900	15,1	12,5	49,6	59,8
Lori	8,0	360	5,7	4,3	47,1	62,8
Saturna	7,5	540	8,0	6,2	51,8	67,1
Eros	7,5	562	6,9	5,8	68,3	81,4
Grata	7,5	612	9,0	7,0	53,2	68,2
Luna	7,5	420	5,2	4,3	67,2	81,0
Augusta	7,5	880	7,8	6,5	93,4	112,4
Oda	7,5	790	14,5	11,6	54,5	43,6
Radoza	7,5	740	7,3	6,1	85,6	101,9
Electre	7,5	383	4,4	3,6	70,3	86,5
Slov'yanka – standard	8,0	1340	12,3	10,0	88,3	108,0

In the study of resistance to mosaic wrinkled found that symptoms of the disease, manifested early in the growing season. Infected plants were stunted and time-opment. On the surface of the leaf blade between the veins bulge observed as an effect-Vie which leaves become wrinkled. Tip and edges of the leaf blade twisted to the bottom (Fig. 3).

In many plants was observed a significant reduction in the size of the plate. Over time, these symptoms are intensified and become dominant. In some cases, on the surface of the leaves were observed small necrotic spots, whereby the leaves as if stained. There was a sharp violation plant growth and development. Flowering plants are often missing. Petioles become brittle-mi leaves dry out, but do not fall off. Over time, the plants were observed gradual extinction of almost all leaves.

Fig.2. **Symptoms of leaf curl virus on potato plants, cultivar Katyusha (Ukraine), 2012.**

Table 3

Resistance to *Potato leaf roll virus L* **and basic household characteristics of resistant potato varieties, 2011-2013**

Variety	Resistance to *Potato leaf roll virus L, p.*	Yield, g /bush	Total number of tubers/ bush, pcs	Number of marketable tubers/bush, pcs	The average tuber weigh, g	Weight of marketable tuber, g
Apta	8,5	620	8,3	7,0	63,0	74,4
Shwalbe	8,5	637	10,2	8,3	51,1	63,0
Aguila	8,5	790	9,0	7,3	70,4	87,3
Kardinal	8,0	1000	12,0	10,0	72,3	85,0
Sante	8,0	1090	13,0	10,4	67,1	84,0
Debora	8,0	650	10,4	8,0	48,0	62,4
Turbella	8,0	900	9,1	7,3	79,4	99,0
Iskra	8,0	640	8,4	7,0	64,0	77,0
Bintij	7,5	400	7,0	6,0	48,2	58,0
Roxy	7,5	660	10,0	8,4	57,0	67,0
Кристал	7,5	1100	9,4	8,0	99,0	117,2
Ada	7,5	577	10,1	9,0	48,1	57,1
Bzura	7,5	375	4,4	4,0	72,0	85,3
Tempora	7,5	680	5,9	5,0	97,1	114,9
Kardula	7,0	720	7,1	6,0	86,0	102,0
Sprint	7,0	500	7,2	6,0	58,0	69,4
Galina	7,0	620	7,2	6,0	72,1	86,3
Jaerla	7,0	980	10,0	8,0	86,4	103,0
Grata	7,0	655	10,1	8,0	51,1	65,0
Ostara	7,0	480	4,2	3,3	90,0	114,3
Resy	7,0	900	14,0	11,0	54,0	66,4
Slov'yanka, st	8,0	1340	12,3	10,0	88,3	108,0

Fig.3. **Symptoms of wrinkled mosaic on potato plants, cultivar Dimock (Ukraine), 2012.**

In primary infection in the year of planting disease developed slowly. First observed mottling or mosaic on the upper leaves, which eventually deformed. Often they celebrated necrosis. In case of late infection signs of the disease in the first year is not fixed and detected only in subsequent reproduction (Fig. 4).

Fig.4. **Symptoms wrinkled mosaic on potato plants, cultivar Sweet-NOC Kiev (Ukraine), 2012.**

As a result of the research, as resistant to mosaic wrinkled varieties were identified: Kardula, Pamir (Germany); Iskra, Galina (Czech Republic); Magura (Romania); Igor (Yugoslavia); Marijke, Desiree, Ostara, Debora, Radosa, Resy (Netherlands) (Tab. 4).

Table 4

Resistance to *Potato virus Y+X, S, A, M* **and basic basic economic characteristics of resistant potato varieties, 2011-2013**

Variety	Resistance to *Potato virus Y+X, S, A, p*	Yield, g /bush	Total number of tubers from one bush, pcs	Number of marketable tubers from one bush, pcs	The average tuber weigh, g	Weight of marketable tuber, g
Pamir	8,5	1266	10,7	9,0	98,8	117,9
Desiree	8,5	1000	8,4	7,1	100,7	119,1
Marijke	8,5	977	8,9	7,3	90,0	109,8
Resy	8,5	900	13,6	11,0	53,9	66,4
Ostara	8,5	480	4,2	3,3	89,9	114,3
Galina	8,0	620	7,2	6,0	72,1	86,3
Debora	8,0	860	11,4	9,0	59,7	75,5
Kardula	7,5	720	7,1	6,0	85,8	101,5
Iskra	7,5	640	8,4	7,0	64,0	76,5
Magura	7,0	750	9,2	7,1	62,6	81,3
Igor	7,0	280	5,5	4,3	39,6	50,8
Radosa	7,0	680	8,8	7,0	62,2	77,7
Slov'yanka – standard	8,0	1340	12,3	10,0	88,3	108,0

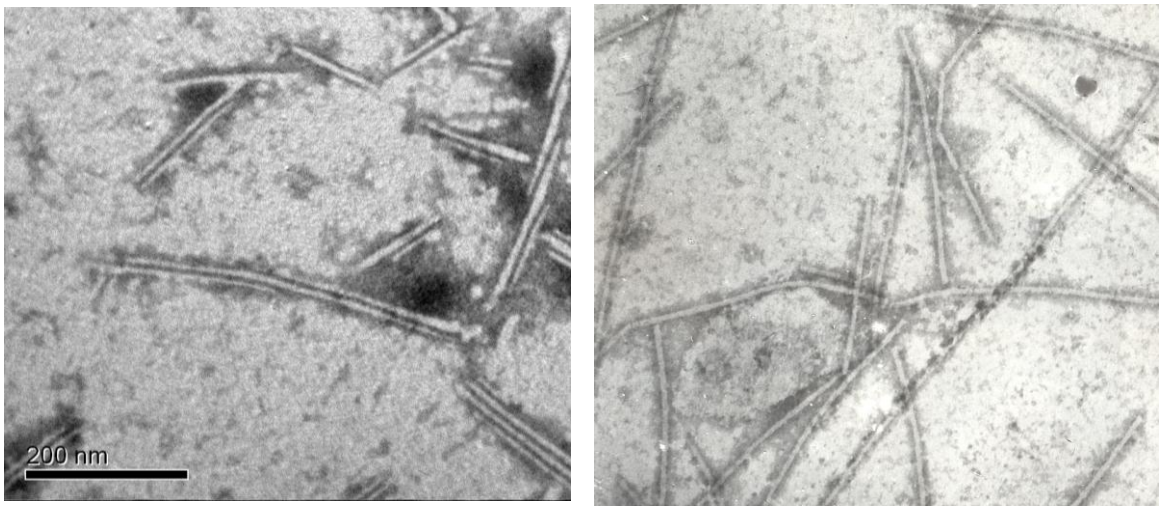
The varieties with high economic characteristics have been allocated: Pamir (1266 g / bush), Desiree (1000 g / bush), Marijke (977 g / bush); with many tubers shared-grade Resy (11,0 pcs.). A study of the average mass of the tuber as large-tuber varieties distinguished: Desiree (100,7 g) and the Pamir (98,8 g).

Thus, on the basis of a comprehensive assessment using virological methods were identified several varieties resistant to streaky and wrinkled mosaics: Desiree and Radoza. Varieties Iskra and Galina were resistant to leaf roll and wrinkled mosaic. Varietie Ostara showed resistance to three viral diseases. The remaining accessions were resistant to only one of the diseases.

During investigations it was found that visual assessment of disease possibly complicated by nonspecific symptoms of some viral diseases, which are similar to the symptoms of fungal or bacterial diseases. Characteristic symptoms resembling viral diseases can be caused by environmental conditions-ditions, soil or mineral deficiency effect on chemical plants reagents. In particular, the symptoms of wrinkles and mosaics appear at the negative impact of high doses of herbicides. Very often similar symptoms with a combination of several negative environmental factors.

Symptoms of viral diseases on plants and tubers are sometimes observed as a non-typical or entirely absent. Therefore, as a significant addition to the visa-hoc diagnosis of varieties in the laboratory diagnosis of virus and ecology of viral diseases "Institute of BioIogy" of the Taras Shevchenko Kyiv National University studies were conducted using a wide range of virologists-cal techniques. By enzyme immunoassay, polymerase chain reaction revealed the presence of virus and wrinkly mosaic MBK and YBK, which was confirmed with the help, means of electron microscopy (Fig. 5).

Viral particles YBK filamentous, modal length of 750 nm [14], according to other sources – 730 × 11 nm [13]. The virus exists as a complex strains that cause a wide variety of symptoms on leaves and tubers of potato, resulting in decreased yield and quality loss of tubers. YBK has the ability to rapidly develop, vatsya with the accumulation of mutations in populations and between strains, prispo-sablivayas to new varieties of potato under different environmental conditions [15].



a) b)

Fig. 5. **The electron diffraction virions MBK and YBK identified in potato leaves: a) Varieties Fausta (Germany), b) Varietie Roslau (Germany); microscope EM-125 and JEM-1230 with an attachment.**

For MBK typical particle length of 650 nm and a width of 12 nm. The virus is also many strains that differ in virulence and may exist for a long time as a latent infection.

Based on our results for the study of samples of potato on availability viral diseases, it is necessary to ensure control of the virus, using the most wide range of methods, as well as to strengthen of the work on varietal breeding for complex resistance to viruses.

CONCLUSIONS

The studies were given an opportunity to highlight a number of varieties that are highly resistant to viral diseases and can be used in further breeding work: resistance to *Potato leaf roll virus L* – Crystal (Russia); Ada, Bzura (Poland); Sprint, Aguila, Roxy, Shwalbe, Tempora, Turbella, Apta, Kardula (Germany); Iskra, Galina (Czech Republic); Jaerla, Sante, Grata, Kardinal, Bintij, Ostara, Debora, Resy (Niderlany); resistant to mosaic virus wrinkly *Potato virus Y* + *Potato virus* X, *Potato virus* S, *Potato virus* A, *Potato virus M* – Kardula, Pamir (Germany); Iskra, Galina (Czech Republic); Magura (Romania); Igor (Yugoslavia); Marijke, Desiree, Ostara, Debora, Radosa, Resy (Netherlands) and banded mosaic *Potato virus Y* – Perspective (Ukraine); Ada (Poland); Sprint, Apta, Agwila, Augusta, Carla, Eros, Grata, Lori, Luna, Oda, Ponta, Shwalbe, Feldeslohn (Germany); Desiree, Ostara, Radoza, Saturna (Netherlands); Electre (Belgium); Maritta (France). How resistant to mosaic banded *Potato virus Y* and wrinkled *Potato virus Y* + *Potato virus* X, *Potato virus* S, *Potato virus* A, *Potato virus M* varieties Desiree and allocated Radoza (Netherlands). Varieties Iskra and Galina (Germany) showed resistance to leaf roll and wrinkled mosaic. Varietie Ostara (Netherlands) showed robust-ness to the three viral diseases: leaf roll, wrinkled and banded mosaics

As a result of the research, it was found that the symptoms of viral diseases on potato varieties maximally manifested in different periods of the growing season: rugose mosaic easily diagnosed in the first half of the growing season (before flowering); Viral and banded leaf rolling mosaic – in the second half of vegetation.

For effective control of viral diseases is necessary to know you must know the nature of the pathogen and its biological properties. Therefore, the detection of the symptoms of the disease to clarify and elucidate the nature of the pathogen should be used a wide range of virusological methods, namely electron-microscopic, physical, immuno-chemistry, molecular biology. Study of the properties we have identified viruses and how they will transfer to fully define the area of their

circulation, to develop a cost-based recommendation on the placement and management of seed production, which will enhance the yield of potatoes.

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ВИВЧЕННЯ КОЛЕКЦІЙНИХ СОРТІВ КАРТОПЛІ НА СТІЙКІСТЬ ДО ВІРУСНИХ ХВОРОБ

Мета. Вивчення колекційних сортів картоплі у південній частині Лісостепу України і виділення зразків, стійких до вірусних хвороб для подальшого використання їх в селекційній роботі.

Результати та обговорення. Досліджена колекція картоплі Устимівської станції рослинництва в кількості 625 зразків із 32 країн близького та далекого зарубіжжя. За біологічним статусом колекція представлена сортами. Під час випробувань було встановлено, що візуальна оцінка хвороб на рослинах може ускладнюватись у зв'язку з неспецифічністю деяких симптомів вірусних хвороб, які мають подібність із симптомами грибних та бактеріальних. У зв'язку з цим, як суттєве доповнення до візуальної діагностики сортів, був використаний широкий спектр вірусологічних методів для ідентифікації вірусів, яка була проведена в Лабораторії екології і діагностики вірусних хвороб ННЦ "Інститут біології" Національного університету імені Тараса Шевченка. Виділені зразки, стійкі до вірусних хвороб: стійкі до вірусу скручування листків картоплі – Кристал (Росія); Ada, Bzura (Польща); Sprint, Aguila, Roxy, Shwalbe, Tempora, Turbella, Apta, Kardula (Німеччина); Iskra, Galina (Чехія); Jaerla, Sante, Grata, Kardinal, Bintij, Ostara, Debora, Resy (Нідерланди); стійкі до вірусу зморшкуватої мозаїки – Kardula, Pamir (Германия); Iskra, Galina (Чехія); Magura (Румунія); Igor (Югославія); Marijke, Desiree, Ostara, Debora, Radosa, Resy (Нідерланди) і смугастої мозаїки – Ракурс (Україна); Ada (Польща); Sprint, Apta, Agwila, Augusta, Carla, Eros, Grata, Lori, Luna, Oda, Ponta, Shwalbe, Feldeslohn (Німеччина); Desiree, Ostara, Radoza, Saturna (Нідерланди); Electre (Бельгія);

Висновки. Виділені сорти рекомендуються для подальшого включення в селекційний процес.

Ключові слова: *картопля, вірусні хвороби, віруси, грунтово-кліматичні умови, візуальна діагностика*

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ИЗУЧЕНИЕ КОЛЛЕКЦИОННЫХ СОРТОВ КАРТОФЕЛЯ НА УСТОЙЧИВОСТЬ К ВИРУСНЫМ БОЛЕЗНЯМ

Цель. Изучение коллекции сортов картофеля в южной части Лесостепи Украины и выделение образцов, устойчивых к вирусным болезням для дальнейшего использования их в селекционной работе.

Результаты и обсуждение. Исследована коллекция картофеля Устимовской опытной станции растениеводства в количестве 625 образцов из 32 стран ближнего и дальнего зарубежья. По биологическому статусу коллекция представлена сортами. Во время исследований было установлено, что визуальная оценка заболеваний может усложняться в связи с неспецифичностью некоторых симптомов, которые имеют сходство с симптомами грибных или бактериальных заболеваний растений. В связи с этим, как существенное дополнение к визуальной диагностике сортов, был использован широкий спектр вирусологических методов для идентификации вирусов, которая была проведена в Лаборатории экологии вирусов и диагностики вирусных заболеваний ННЦ «Институт биологии» Национального университета имени Тараса Шевченка. Результаты

вирусологических исследований подтвердили наличие вирусов в инфицированных растениях. В результате изучения выделены образцы, устойчивые к вирусным болезням: устойчивые к вирусу скручивания листьев картофеля – Кристал (Россия); Ada, Bzura (Польша); Sprint, Aguila, Roxy, Shwalbe, Tempora, Turbella, Apta, Kardula (Германия); Iskra, Galina (Чехия); Jaerla, Sante, Grata, Kardinal, Bintij, Ostara, Debora, Resy (Нидерланы); устойчивые к вирусу морщинистой мозаики – Kardula, Pamir (Германия); Iskra, Galina (Чехия); Magura (Румыния); Igor (Югославия); Marijke, Desiree, Ostara, Debora, Radosa, Resy (Нидерланды) и полосчатой мозаике – Ракурс (Украина); Ada (Польша); Sprint, Apta, Agwila, Augusta, Carla, Eros, Grata, Lori, Luna, Oda, Ponta, Shwalbe, Feldeslohn (Германия); Desiree, Ostara, Radoza, Saturna (Нидерланды); Electre (Бельгия); Maritta (Франция).

Выводы. Выделенные сорта рекомендуются для дальнейшего включения в селекционный процесс.

Ключевые слова: *картофель, вирусные болезни, вирусы, почвенно-климатические условия, визуальная диагностика*