Verigo D.D.
Republican Center for Ecology and Local Study, Minsk, Republic of Belarus;
Scientific adviser: Russkikh Ivan Anatolyevich

CREATION A COLLECTION OF PHYTOPATHOGENIC MICROORGANISMS

The urgent problem of modern agriculture is the need to develop various means of protection against phytopathogenic microorganisms. Collections of local phytopathogens are of the greatest practical value. From 36 samples of affected plant parts, at least 23 species of isolates of phytopathogenic fungi were isolated and identified, 16 fungal isolates and 2 strains of bacteria are awaiting identification.

Актуальной проблемой современного сельского хозяйства является необходимость разработки различных средств защиты от фитопатогенных микроорганизмов. Наибольшую практическую ценность имеют коллекции местных фитопатогенов. Из 36 образцов пораженных частей растений выделены и идентифицированы не менее 23 видов изолятов фитопатогенных грибов, 16 грибковых изолятов и 2 штамма бактерий ожидают идентификации.

Key words: phytopathogenic microorganisms; collection of local strains.

Ключевые слова: фитопатогенные микроорганизмы; коллекция местных штаммов.

Currently, the urgent problem of modern agriculture is the necessity to develop various means of protection against phytopathogenic microorganisms. Phytopathogens include a variety of microorganisms, such as bacteria, including phytoplasmas and mycoplasmas, and fungi. They cause various plant diseases, causing significant damage to agriculture.

According to the FAO, annually up to 40 % of all food plants in the world die due to pests and diseases. The loss in agriculture is more than $ 220 billion a year, and millions of people face the threat of hunger. The importance of protecting plants from disease is understood at the highest level. 2020 has been declared by FAO as the International Year of Plant Health.

To develop plant protection products against diseases in the laboratory, it is necessary to test both chemically synthesized substances and antagonistic organisms for their effectiveness. And for this it is necessary to have a culture of target phytopathogens. Such collections are created and maintained by many research and educational institutions.

At the same time, the phytopathogens of each locality can have unique properties, for example, resistance to various plant protection products. Therefore, the collection of local strains of phytopathogens is important for the development of plant protection products suitable for a particular area. That is why collections of local phytopathogens have the greatest practical value. Based on the foregoing, the goal of our work is to create a collection of phytopathogenic microorganisms that inhabit the territory of the Republican Center for Ecology and Local Study.

To achieve this goal, we had to solve a number of problems:

1) Identify plants with signs of disease.

2) To take plant samples with signs of disease damage, as well as the soil on which diseased plants grew. By external signs, determine the nature of the disease.

3) Isolate the microorganisms inhabiting the selected samples.

4) Among the selected microorganisms, select those possessing the typical signs of the desired phytopathogen.

5) Get pure cultures based on the selected microorganisms and create a working collection based on them.

6) To study the strains of the working collection according to the morphological, microscopic and cultural characteristics.

7) Based on the working collection, create a collection of identified phytopathogenic microorganisms.

As a result, from 36 samples of the affected parts of plants, we were able to isolate and identify at least 23 species of phytopathogenic fungi isolate. In addition, 16 fungal isolates and 2 bacterial strains are awaiting identification.

Among the fungi, the most numerous were representatives of the genus *Fusarium*. In total, our collection has 8 *Fusarium* isolates. We isolated them from the wilted stalks of tomato and eggplant, from the surface of onion and rockambol bulbs, stalks and ears of corn, from the surface of zucchini fruit, sunflower leaves, and also from the soil.

Fusarium causes various symptoms of diseases, including spots, rot, but the most dangerous is wilting, since this symptom indicates a systemic effect of *Fusarium* on the plant and penetration into the vascular system. The morphological differences of the colonies by the nature of the growth of mycelium, its color suggest that in our collection there are several species of *Fusarium*, including the dangerous *Fusarium oxysporum*. The most characteristic for *Fusarium* in the determination is the presence of a pink pigment secreted into the medium, as well as a sickle-shaped macroconidia.

We have also identified several species or varieties of fungi belonging to the genus *Penicillium*. They often cause damage to fruits and vegetables during storage. For example, we selected the *Penicillium expánsum* from the surface of apple fruits. Penicillus, presumably palmate *(Penicíllium digitátum*) - from the fruits of mandarin was also isolated. It is interesting in that it is often resistant to a number of active substances of synthetic plant protection products. Also, *Penicillium* is characterized by conidiophores in the form of panicles.

Gray rot caused by the fungus *Botrýtis cinérea*. We carried out the isolation of this fungus from the affected raspberry fruit. In this fungus, the mycelium has a gray color, and the conidiophores resemble the shape of a tree branch. On a petri dish, the fungus forms sclerotia in the form of dense black formations.

Fungi of the genus *Alternaria* cause alternariosis in plants in the form of various spots. *Alternaria* affects tomatoes, carrots, potatoes and many other plants. *Alternaria* is characterized by dicticonidia at the end of the conidiophores.

Also, from the fruits of tomato, we isolated the causative agent of late blight *Phytophthora infestans*. This is a mushroom-like organism related to oomycetes. *Phytophthora infestance* on petri dishes forms a white fluffy mycelium. *Phytophthora* does not form conidia, but multiplies by zoospores.

A dangerous causative agent of fruit rot is *Monilia*, which causes moniliosis. We isolated this pathogen from the fruits of the apple tree. *Monilia fructigena* forms a fluffy white mycelium on Czapek agar. Conidia are round or oval.

We also isolated some of the fungi of the genus Aspergillus, which causes the formation of the so-called Sooty fungus. The sources of its isolation were plants from the greenhouse, affected by whiteflies and mealybugs. This fungus settles on the secretions of these pests.

Thus, the practical result of our work is the creation of a collection of phytopathogens that parasitize plants growing on the territory of the Republican Center. This collection can be used to evaluate the effectiveness of various antagonistic organisms against a wide range of pathogens, test various plant protection products and to assess the resistance of varieties to diseases.

We will continue our work in the direction of identifying isolated microorganisms, as well as testing their virulence in relation to various plants.