

Brief information about the project

Name of the project	AP14871628 «Isolation, molecular taxonomic identification and nematophagous activity study of Southern Kazakhstan predatory fungi for promising strains selection to create bionematocides» (0122PK00770)
Relevance	<p>Phytoparasitic nematodes cause serious damage to world agricultural production. Biological control of nematodes using their natural enemies (bacteria, predatory fungi, etc.) has become the basis for the development of organic agriculture, due to its safety and environmental compatibility. The study of the mechanism of interaction between predatory fungi and nematodes will provide a theoretical basis for the development of effective means of biocontrol of nematodes. In Kazakhstan, biological methods are not used to combat nematodes, and according to our data, no such studies have been conducted.</p> <p>The main approaches for conducting research under the project: isolation and molecular taxonomic identification of predatory fungi; morphological and biochemical studies of the processes of formation of trapping devices; search and isolation of strains of predatory fungi; selection of promising strains of predatory fungi for the creation of biological products to combat local species of parasitic nematodes. As a result of the project, highly qualified specialists will be trained from among young scientists, who will be in demand in world science. Based on the results obtained, strains of predatory fungi will be obtained and propagated to create and produce competitive nematocide biological products that are in constant demand in the domestic and world markets.</p>
Purpose	Isolation, molecular taxonomic identification of predatory hematophagous fungi of Southern Kazakhstan, assessment of their nematocidal activity and selection of promising strains for the creation of biocontrol preparations of local phytoparasitic nematodes.
Objectives	<ol style="list-style-type: none">1. Isolation and morphological identification of strains of predatory fungi;2. Optimization of methods of selection and maintenance of stably active strains of predatory fungi in pure culture and induction of chlamydospore formation;3. Isolation and morphological identification of phytoparasitic nematodes from soil samples of South Kazakhstan;4. Molecular taxonomic identification of isolated predatory fungi;5. Screening of isolated predatory fungi for the ability to form trapping structures using various types of nematodes;

	<ol style="list-style-type: none"> 6. Biocontrol of parasitic nematodes using isolated strains of predatory fungi when growing vegetable crops (laboratory experiments); 7. Assessment of predatory activity of identified fungi in the rhizosphere of potato, tomato, sugar beet plants in the presence of nematodes (greenhouse); 8. Selection of promising strains of predatory fungi for the creation of biological products (nematicides) to combat parasitic nematodes;
Expected and achieved results	<p>For the first time in the world, strains of nematophagous (predatory) fungi have been isolated from the soils of farmlands in Southern Kazakhstan. Phylogenetic identification of isolated strains of predatory fungi was carried out using modern methods of molecular genetic analysis. As a result of the analysis, the following species were identified and a phylogenetic tree was built: <i>Orbilia oligospora</i>, <i>Duddingtonia flagrans</i>, <i>Arthrobotrys flagrans</i>, <i>Arthrobotrys sp.</i> Phytoparasitic nematodes have also been isolated from the same soil samples using proven techniques. Screening of isolated predatory fungi for the ability to form trapping structures using various types of phytoparasitic nematodes was carried out. As a result, the nematophagic activity was: 1. <i>Orbilia oligospora</i> - 100%; 2. <i>Duddingtonia flagrans</i> - 100%; 3. <i>Arthrobotrys sp</i> - 100%.</p>
Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles	<ol style="list-style-type: none"> 1. Boguspaev Kenzhe-Karim Kasym-Karimovich, Doctor of Biological Sciences, Associate Professor, Hirsch Index – 2; ORCID: 0000-0001-7747-6603, Scopus Author ID: 57195073994 2. Kanalbek Gulzat Kairatbekkyzy, senior lecturer, PhD doctoral student, ORCID: 0000-0003-1630-5303. 3. Faleev D.G., PhD, Hirsch index–1. Scopus author ID: 57195066939, ORCID: 0000-0003-3909-0237 4. Mukhatayeva as.B.N., Professor, Department of Biology and Biotechnology, Al-Farabi Kazakh National University 5. Omirbekova A. A. PhD, Hirsch Index-3. Scopus author ID: 56507360700, ORCID: 0000-0002-5667-6240 6. Nusupov A. A., doctoral student 7. Sisemali K.R. Master, ORCHID: 0000-0003-0014-6176
List of publications with links to them	-
Patents	-