

Editorial

## Short Information about the Global Trends Regarding Fungal Genomics and Biology

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My scientific interest is connected with problems related to entomopathogenic and antagonistic fungi. This direction of research is intensively development as a result of expansion of organic agriculture and requirement to create new ecologically friendly pesticides based on microorganisms. As a result, the research is realized by extended front including isolation and identification of fungi, estimation of principal biological properties of fungal isolates, mass-production of species with suitable characteristics for pest control, formulation of fungal biomass, different aspect of practical application of mycopesticides and some others.

During last years, the global trends are moving to study fungal genomics for more accurate identification of strains and understanding of evolution and phylogenetic relationship between different groups of fungi. At the present time, the establishment of fungal DNA profiling is the most being elaborated aspect of mycology. It is very important for scientific and applied aspects of mycology.

Other important aspect of fungal study is determination of function of genes especially genes responsible for insecticidal and antagonistic activity. This research direction has a lot of unresolved problems together with population characteristics of the most important for biocontrol fungal species and relationship between different fungal genotypes. Principal importance for successful development of mycological direction of pest control is study on population level of the host-pathogen interaction in the time based on molecular-genetically analyses.

Development of protoplast fusion technology and its biotechnological applications are the relatively new trends regarding entomopathogenic and antagonistic fungi. Hybridization of different strains and species can be used to produce high effective form of fungi for different needs, as well as production mycopesticides, mushrooms, antibiotics, different others biologically active substances, etc. Fusion technique will allow producing newer classes of therapeutically important materials. Numerous researches are to be carried out for development of newer mutation and screening technique for accelerating fusion studies.

Additional new trend is the investigation of different aspects

of interaction between entomopathogenic fungal endophytes and different agricultural crops. This new direction is very attractive for industry because there are existing strong requirements to have effective technologies, formulations, or delivery methods that enhance active ingredient uptake into plant foliage in order to increase efficacy compared with commercial standards. The new information about existing association Beauveria spp., Metarhizium spp., Lecanicillium spp., Trichoderma spp. and some other entomopathogenic and antagonistic fungi with different agricultural crops, and this association providing plant resistant to different pests including both phytopathogens and arthropods was published in the last decade. But, information about this phenomenon is very scanty, and industry does not produce any formulations based on this phenomenon. It can be affirmed that there are definite differences between entomopathogenic fungi and their isolates linked with possibility to exist as endosymbionts in plant tissues. But, there is not specific information about that. Beside this, important information we do not know is what are the conditions necessary for penetration and persistence fungal propagules in plant tissues?

In that way, besides traditional research of entomopathogenic and antagonistic fungi, the last years were significantly expanded following scientific directions:

- 1. Establishment of fungal DNA profiling and determination of function of genes especially responsible for specific activity.
- 2. Founding population characteristics the most important for biocontrol fungal species and establishment of relationship between different fungal genotypes.
- 3. Study of host-pathogen interaction on population level in the time based on molecular-genetically analyses.
- 4. Hybridization of different fungal species and strains based on protoplast fusion for scientific and applied needs.
- 5. Study of endophytic fungi from point of view relationship with plants and possibility to use this phenomenon for practical needs.

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