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Diversity of Micromycetes Which Found in Phyllosphere and Rhizosphere of Leguminous Plants

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ABSTRACT

Mycocomplex of 6 distributed and planted sorts of legumes grown in Azerbaijan conditions rhizosphere and phyllosphere frequencies had been studied. It was determined that 48 types of fungus investigated are playing role at formation of leguminous crops mycocomplex such as Botrytis pyramidalis (Bonord.) Sacca. Circinella Hesselt linderi. & Fennell, Cladosporium Epiphyllum (Pers.) Nees, Fusarium subglutinans (Wollenw. & Reinking) PE Lendn dimorphosporus Nelson and Mucor. Which are the species detected in Azerbaijan's nature for the first time. In addition to that, it became clear that there is a specific behavior detected at legumes' mycocomplex formation that is involved similarly in combination of toxins, allergens and opportunists.

KEYWORDS: legumes, rhizosphere. phillospher, mycocomplex, toxin, allergens, opportunistic species.

INTRODUCTION

Soil fungus-is the universal type of a fungus that is involved in formation of the fertility of the soil as in [20] saprotroph organisms different species and diversities as in[6] groups. According to the number defined all over the Earth the types of fungus is stretched out to the millions but only around 100 thousands of them were specified and described accordingly, although the rest 50 thousand of them are considered to be of the type of micromycetes such as in [4, 8, 17-18].

Micromycetes are characterized as a body passing through a wide range of spectrum according to the success in adaptation procedures and can be detected in most of the places. Absorption ability of substrates of different types, and the fast adaptation characteristics to the nature are the dominant features of micromycetes to be the winner in competence in mycocenosis[14].

Soil micromycetes are divided in two, as the plants which are having the distinct features of species living in their rhizosphere (fed around the root), and rhizoplanes (fed on the root surface), the seconds are considered to be those that produce mycorrhiza and that are pathogenic for the roots of plants. The root exudation is playing role for the fungus digestion atmosphere, which is affecting the soil fungus selectively. It is considered that from such land plants mushrooms rhizosphere and a variety of specific forms the micromyscetes mycobiot phytopathogenic was emerged[4].

These fungi and the gathering and planting of ecolo-trophic forms of fungi, which is toxin, can be considered very harmful source for human health. According to all these factors, it is very important to arrange the mycobiomonitorings for the checkup of the agro ecosystem or for the anthropogenic ecosystem of soil's hygienic aspects. It is no coincidence that the land phytopathogenic and toxigenic fungi contamination escalates, the environmental, economic and national security problems characterized in terms of the real imperiled source appeared as the social-technological problem beginning from the second half XX century's[10, 16].

Many studies had been carried out for a long time regarding the micromisetes dissemination in various regions of the Earth, including few regions of Azerbaijan's territory[1-2]. However, there is not enough researches provided on the variety of plants, primarily related to the study of legumes mycobiota around root. If we consider the specific characteristics of each regions ecological conditions and the biota for those same regions, we could mention the relevance of these studies without doubts.

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Therefore, the aim of the study presented is dedicated to measure the danger from the wild and cultivated legume crops rhizosphere mycocomplexes species composition, as well as their share of the determination of the species of plants.

In this study the selection of leguminous crops, legumes are associated with study of their contents and species characteristics because the legumes (Fabaceae Lindl., or Leguminosae Lindl.) is the most wide spread group of those plants.

At present, we can find around 700 genes and 17000 kinds of these plants as they are seen among trees, grasses and other plants [19]. Moreover, we can see consumption of legumes in wide range of spectrum used in food, medical and other sources. Finally, it should be noted that, the wide spread of legumes is common in Azerbaijan's culture also.

MATERIALS AND METHODS OF THE CASE

Taking into account that leguminous plants have a wide range of plant species, therefore as an object of research we select and cultivate grasses to legumes, mushrooms settled rhizosphere, which are distributed, in Azerbaijan area. Medicago sativa L. for withdrawal samples, Ornithopussativus L., Phaseolus vulgaris L., Trifolium fontanum Bobr. T. pratense L., Trepens (L.) Presl. leguminous plants rhizospheres have been used.

Sampling was carried out in accordance with the principles generally accepted [11]. Soil samples of the various development phases of plants (burgeoning and flowering) that were taken from the plant root exudates are the maximum. Attenuated taken soil samples (1: 100, 1: 1000 and 1: 10000), the suspensions nutritious are put in environmental condition for a period of 3-5 days at a temperature of 28^0C for incubation. The colonies resulting from this procedure are continued to the period until the pure culture is obtained.

The plant leaves from plants, phylloplant are put to the laundering process repeated for 4 times until the fungi epiphytes are withdrawn [11]. Phytopathogenic fungi separation is being processed by the standard methodology [13] was carried out in accordance with.

Fungi epiphytes toxicity, opportunistic criteria, and allergenic reaction for the people was specified with different modifiers: P.N. Kashkina et al. [9]; Bilay V.I. and Z.A. Kubratskaya[5]; Sutton D., Fothergill A., Rinaldi M. [15]; Elinova N.P.[7]; Benndorf D. et al.[3].

All tests were taken repeatedly 4 times, the results which were considered to be pure came out from statistically pure results with exact correctness as $m/M \leq 0,05$ formula (where M - the average value of repetitions, m - an average square shift) meeting the criteria which was considered reliable [12].

ACHIEVED RESULTS AND THEIR EXPLANATION

As it, known that the structure of the soil micromycetes lands, including those used for agriculture can play a role in monitoring the informative parameter. For this reason, the mycological analysis had been identified from the samples that were taken from the areas where the legumes are grown and planted or rhizosphere and phyllosphere for the taxonomic relation of legumes in early stages of number of studies. The types, which presented in total, were identified according to their types, which are as the followings: the dominant ones; frequently observed; rare observed.

From the results obtained among 48 types of fungi, it was identified that the fungi of plants can vary according to their distribution in rhizosphere and phyllosphere (Tab. 1). Apparently the phillosphere and rhizosphere's dominant types are represented in different combinations, and these types in their turn differ from the mycobiota of soil used as control land (the same soil type with no plants where the samples were taken). All this samples taken are related to the process of feeding the plants with various methods and various elements. The root's various exudates content of different plants plays a definite role in this procedure.

It should be noted that despite the presence of various genes types in legume's rhizosphere and phillosphere mycocomplex, Aspergillus, Fusarium and Penisillium types of genes are more actively present for all the plants had been noticed.

On the other hand, it became clear from the mycological researches that the distribution of above mentioned fungi Botrytis pyramidal (Bonord.) Sacca. Circinella Hesselt linderi. & Fennell, Cladosporium Epiphyllum (Pers.) Nees, Fusarium subglutinans (Wollenw. & Reinking) PE Lendn dimorphosporus Nelson and Mucor. Fungi had been available (seen) in the area of Azerbaijan for the first time.

Table 1. Fungi isolated from the rhizosphere and phyllosphere of leguminous plants and their characteristics by frequency of occurrence.

Species of fungi	Control	M.sativa	O.sativus	Ph.vulgaris	T.fontanum	T. pratense	T.repens
1	2	3	4	5	6	7	8
Actinomucor elegans (Eidam) C.R. Benj. & Hesselt.	+	+	-	-	+	-	-
Alternaria alternata (Fr.) Keissl	-	+	+	+	+	+	+
A. tenuissima (Kunze) Wiltshire	-	+	-	+	-	-	-
Ascochyta phaseolorum Sacc.	-	-	-	+	-	-	-
A. trifolii Bondartsev & Trusova	-	-	-	-	-	+	-
Aspergillu fumigatus Fresen	-	+	+	+	-	+	+
A. niger Tiegh	+	+	+	+	+	+	+
A. ochraceus Wilh.	-	+	+	-	+	+	-
A. terreus Thom	+	-	-	+	-	-	-
A. versicolor (Vuill.) Tirab	+	-	+	-	+	+	+
Botrytis c	-	-	+	-	+	+	+
Botrytis pyramidalis (Bonord.) Sacc.	+	+	-	-	-	-	-
Candida albicans (C.P. Robin) Berkhout	+	+	-	-	-	-	-
Circinella linderi Hesselt. & Fennell	+	-				+	
Cladosporium cladosporioides (Fresen.) G.A. de Vries	-	-	+	-	+	+	-
C.epiphyllum (Pers.) Nees	+	+	-	-	-	-	+
Cunninghamella echinulata (Thaxter) Thaxter	+	+	-	+	-	+	-
Erysiphe communis f. trifolii Rabenh.	-	-	-	-	-	+	-
Fusarium moniliforme Sheldon	+	-	+	+	+	+	+
F. oxysporum Schltdl.	+	+	+	+	+	+	+
F. semitectum Berk. & Ravenel	+	-	-	+	-	-	-
F. solani (Mart.) Sacc	-	-	+	-	+	+	+
F. sporotrichioides Sherb.	-	-	+	+	+	-	+
F. subglutinans (Wollenw. & Reinking) P.E. Nelson, Toussoun & Marasas	+	+	-	-	-	-	-
Mucor dimorphosporus Lendn.	+	+	+	-	+	-	-
M.hiemalis Wehmer	+	-	-	+	-	+	+
M.strictus Hagem	+	+				-	
Peniciliium chrysogenum Thom	+	-	+	+	+	+	+
P. corymbiferum Westling	+	-	+	-	+	-	_
P.cyaneofulvum Biourge	+	-	+	-	-	-	-
P. cyclopium Westling	-	+	+	+	+	+	+
P. decumbens Thom	+	+	-	-	-	+	-
P. expansum Link	+	-	+	+	+	+	-
P. funiculosum Thom	+	+	+	+	+	+	+
P. lanosum Westling	+	+	+	-	+	+	-
P. martensii Biourge	+	-	-	+	-	+	+
P. purpurogenum Stoll	+	+	+	-	+	+	-
P. stoloniferum Thom	+	-	+	+	-	+	+
Phoma melaena (Fr.) Mont. & Durieu	-	-	-	+	-	-	+
Rhizopus microsporus Tiegh	+	+	-	-	-	-	-
R. nigricans Ehrenb.	+	-	-	+	-	+	-
R. stolonifer (Ehrenb.) Vuill.	-	-	+	+	+	+	+
Trichoderma koningii Oudem.	+	-	+	-	-	-	-
T.lignorum (Tode) Harz	+	+	+	+	+	-	+
T. viride Pers.	+	-	-	-	-	+	+
Trichothecium roseum (Pers.) Link	-	-	-	-	+	+	-
Uromyces onobrychidis (Desm.) Lév.	-	-	+	-	-	-	-
Verticillium album (Preuss) Pidopl.	-	+	+	+	+	+	+

Ryzosphere legumes and characterization of phyllosphere showed that the prevalence mycobiotas formed, which is universal for all the plants, all the plants studied in the same order (dominant or frequently encountered) described species are found. According to the frequency observed in legumes rhizosphere and phyllosphere micobiota it was identified that among all of plants studied, the dominant or the frequent fungi are detected. For example, fungi separated from the plants rhizosphere, 3 are dominant, 8 are frequent, and the 11 are characterized as the rare types. Similarly, respectively plant pointer 4, 9, 16 species are represented.

Aspergillus niger, Penicillium funiculosum both plants are dominant, Alternaria alternata, Fusarium oxysporium, Penicillium cyclopium and Trichoderma lignorum types of fungi belong to frequent types. For dominant types, it is acceptable to have 50,4-60,3% prevalence rate and for frequent types, it is considered around 15,5-40,2%.

It should be emphasized that the condition caused by pathogenic fungi or opportunistic mycoses represented a serious threat to human health, which studies have repeatedly confirmed. In addition, fungi form toxic substances that cause allergy in humans and species are also included. It should be mentioned that there is a toxic synthesis produced by fungi, which can also can cause allergic reactions for human body. When characterizing this aspect phyllosphere mycocomplex rhizosfer legumes, and it is clear that the above-mentioned, there are mushrooms that match characteristic. If to consider the legumes phyllosphere and rhizosphere mycocomplex from these aspects, it is clear that there is an enough quantity (amount) of fungi, which matches this criterion. For example Rhizosphere and phyllosphere mycocomplexses of plant M.sativas compose 45% of opportunists(Alternaria alternate, A. tenuissima, Aspergillus fumigatus, A. niger, Candida albicans, Fusarium oxysporium, Fsemitectum, Penicillium purpurogenum, Trichoderma lignorum, Verticillium album), 54,5 oftoxigens (Alternaria alternate, A. tenuissima, Aspergillu fumigatus, A. niger, A. ochraceus Fusarium cyclopium oxysporium P., P. decumbens, P. funiculosum, Planosum, Penicillium purpurogenum, Verticillium album), and 27,3% of allergens(Alternaria alternate, Aspergillus fumigatus, A. niger, Candida albicans, Fusarium oxysporium and Pfuniculosum) is formed 29,4-56,7% of similar indicators in other plants. It should be noted that studies conducted elsewhere identified that formation of legumes plant mycocomplexes 29-53% determined by the opportunists.

RESULT

Thus, it is clear that investigations, legumes and phyllospheres mycocomplex ryzospheres type of fungus that is involved in the formation of 48, among them the first time, defined the nature of the distribution of species are found. At the same time it became clear that the formation of a separate legumes mycocomplex specificity observed signs that the opportunists, are seen in combination with participation of toxigens and allergens.

Thus, from the studies conducted it is possible to say that around 48 types of fungi is present in phillosphere and rhizosphere of legumes mycocomplex which have been detected in Azerbaijan's nature for the first time, and the different types legumes's mycocomplex formation may have specific elements of formation which was identified from the opportunists, toxins and allergens combination presence.

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