THE RESULT OF PLANT PATHOGENIC FUSARIUM SPP ISOLATED FROM CONIFEROUS FOREST IN NEAR ULAANBATAAR CITY

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ABSTRACT

Fusarium type of fungi forms whitish or bright color and grows really fast. Fusarium subglutinans f.sp. pini (F.circinatum Nirenbery & O'Donnell), F. Oxysporum f.sp. psidii and F.solani are widely distributed plant entomopathogenic fungi. This fungus usually gives a signs of yellowing, drying and shedding when causing disease.

Main aim of our study is to identify Fusarium spp fungi based on disease symptoms such as yellowing, drying and shedding of the needles then define isolated pure culture of fungi and formulate control method. [4,6,7]

In this study a total of sixty-nine samples including larch, pine and spruce were collected from 8 locations out of 127 pieces collected from 13 locations are used. According to standard methodology, when isolating mixed and pure culture samples were placed on wet Petri dish in incubator at 26^0C for 7 days until the fungus growth appeared also average mycelia growth and conidia have observed.

This Fusarium specie typically gives whitish tinged grayish-violent color in colony center on PDA. Observing culture mycelia growth and conidia, genus name has identified using "Identification of Mitosporic Fungi" by Dr. Katsuhiko Ando. When formulating control method against fungi, bioproduct of Bacillus subtilis 26D strain, made in Russian as well as plant originated bioproduct called 1.5 % Matrine & Osthole As made in China have been experimented against entomopathogenic fungi Fusarium spp are used. Based on the study results Fusarium type of fungi is detected from samples taken from Bogdiin am, Jigjid and Taivan mountain. Hence bioproduct of Bacillus subtilis 26D strain inhibited fungal growth whereas can be possible biocontrol for Fusarium spp whereas plant originated bioproduct 1.5% Matrine & Osthole AS made in P.R.C cannot inhibit the growth of this fungi.

Forest morbidity is not well researched in Mongolia. Based on our research forest regions near Ulaanbaatar city have higher morbidity rate. Disease symptoms of conifers have shown yellowing, drying and even shedding of the needles.

A total of sixty-nine samples including larch, pine and spruce were collected from 8 locations near Ulaanbaatar city. Samples were placed on wet plates in incubator at 26^0C for 7 days until the fungus growth appeared. Fresh fungal growth from the plated samples then transferred onto PDA. Fusarium species typically have average mycelia growth, aerial mycelium and gives whitish tinged grayish-violent color in colony center on PDA.

KEY WORDS: *F.circinatum*, pure culture, culture morphology, biopstiside

INRODUCTION

8.26 % of our territory is covered with forests. 63.03 %, of them are larch, 15,32 % pinus, 15,32 % poplar, 11.2 % birch and 5 % spruce are account for Mongolian forest. Larch, pinus, spruce trees are included in Pinaceae family conifers and originated from temperate zone of north regions of world globe. These conifers are also distributed in Russian and Canadian forest regions and the main genus generating Mongolian forest. Yellowing, drying and shedding of the needles and even spotting signs were abundant among larch, pinus and spruce tree diseases.

Fusarium kind of fungi usually causes disease in crop plants. Even though morbidity is not well researched in our country, by observing disease symptoms hence defining disease causing *Fusarium* type of fungi and formulating control method can be a novelty of my research. There are 84 species of *Fusarium* available and 4 of them cause disease in humans and 6 of them are plant disease causing specie. Examples of plant disease causing species include *F. Graminearum, Fusarium oxysporum f.sp. cubense*, *Fusarium bubigenum* and *Fusarium subglutinans f.sp. pini*. Out of these species plant disease caused by *Fusarium oxysporum f.lycopersici* specie is widely distributed in tomatoes grown in green house of Mongolia. In laboratory condition, *Fusarium* spp fungi have been isolated from ill conifers and when grown on PDA pinkish culture have appeared. In order to define the fungi, cultures have grown in 26^0C for one week and its average mycelia growth and conidia have observed.

Nowadays, chemical pesticide's usage has been refused and biological and plant origin biopesticides usage has becoming increasingly popular. Thus, based on the current situation, bioproduct of *Bacillus subtilis* 26D strain, which widely used against vegetable and crop plant disease, made in Russian as well as plant originated bioproduct called 1.5 % Matrine & Osthole As made in P.R.C have been experimented against entomopathogenic fungi *Fusarium* spp.

MATERIAL AND METHOD

Materials: Scissors, sample bags, GPS, refrigerator, biological safety cabinet, incubator, microscope, petri dishes, filter paper, alcohol lamps, microbiological loop, microscope slide, tweezers, distilled water, 2% NaClO solution, potato dextrose agar, Bacillussubtilis-26D strain biopesticide, 1.5% Matrine & Osthole As

Prepare potato dextrose agar:

Potato	200 g
Glucose	20 g
Agar	20 g
Distilled water	1000 ml
pH	7.0

Isolated pathogenic fungi:

Collected samples: Total 74 samples were collected from Ar zaisan, Nuht, Chingeltei, Taivan mountain, Sharga moritiin am, Jigjidiin am, Yargaitiin am, Goodoi am, Yargaitiin bogino am, Sanzai Am as coniferous forest near Ulaanbaatar city. Naturally infected sample were used to isolate *Fusarium* spp mixed culture [1].

Growth fungi in laboratory: Infected samples were cut into small pieces and surface sterilized with 2% sodium hypochlorite solution for 2 minutes. Thereafter, samples were washed twice with sterilized distilled water before placing them on wet plates in incubator at 26^0C for 7-21 days until the fungus growth appeared.

Isolating pathogenic fungus mixed culture

Isolate mixed culture: After fungus growth have appeared transferred it to PDA in incubator at 26^0C for 3-5 days [3,5].

Isolating *Fusarium* spp pure culture

Isolate pure culture: mixed cultures were transferred on PDA in incubator at 26^0C for 5-7 days [3,5].

Identification of *Fusarium* spp

Identified *Fusarium* spp observed pathogenic fungal culture morphology, mycelium and conidia and used Dr. Katsuhiko Ando's "Identification of Mitosporic Fungi" book [2].

Biocontrolled *Fusarium* spp fungi

Bacillus subtilis 26D strain biopesticide as protect crop, vegetable from fungal and bacterial disease was made in Russian Federation, 1.5% Matrine & Osthole As were transferred on PDA with *Fusarium* spp fungi. Observed growth of mycelium and control [4].

RESULT

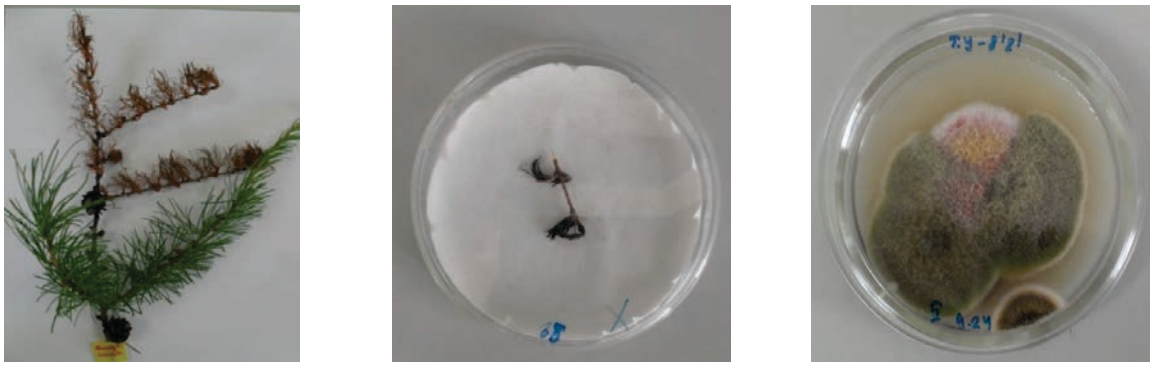
Table 1

Isolated *Fusarium* spp fungi

№	Places	Number of samples	Number of isolated *Fusarium* spp	Colony color	Conifer	Symptoms of disease
1	Ar zaisangiin am N $47^0$51'27.8" E $106^0$54'13.9"	28	1	Pinkish	Larch	Needles were yellowing and drying
2	Nuhtiin am N $47^0$49'58.9" E $106^0$53'59"	14	-	-	-	-
3	Taivan uul N $48^0$04'39.9" E $106^0$56'56.1"	2	1	Pinkish	Larch	Needles were yellowing and drying
4	Sharga moritiin am N $48^0$04'01.4" E $106^0$56'19.3"	4	-	-	-	-
5	Jigjidiin am N $48^0$02'51.4" E $106^0$53'39.2"	6	1	Pinkish	Larch	Needles were yellowing and drying
6	Yargaitiin am N $48^0$02'11.6" E $106^0$53'38,5"	5	-	-	-	-
7	Yargaitiin bogino N $48^0$02'20.6" E $106^0$55'22.8"	8	-	-	-	-
8	Sanzai am N $48^0$7'42.5" E $106^0$53'22.3"	2	-	-	-	-

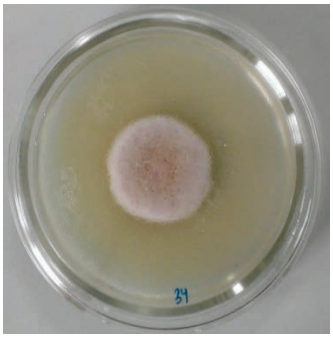
As seen from above table 1, *Fusarium* spp isolated from larch trees in Ar zaisan, Taivan uul and Jigjid areas. Out of Sixty nine samples *Fusarium* spp is found from three samples. Main fungi have not found from others conifers. We have not quite finished with the study of plant pathogenic *Fusarium* spp distribution near Ulaanbaatar.

In this research we also studied *Bacillus subtilis* 26D strain which was made in Russian federation can be possible biocontrol for *Fusarium* spp whereas 1.5% Matrine & Osthole AS can't be biocontrol for *Fusarium* spp.

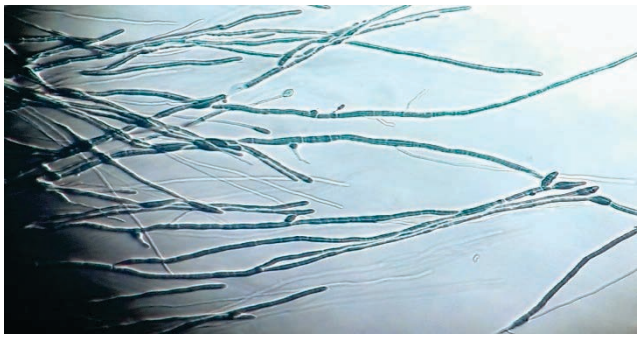


a. Diseased sample b. Placed on wet Petri dish c. Mixed culture

Figure 1. Isolated mixed culture

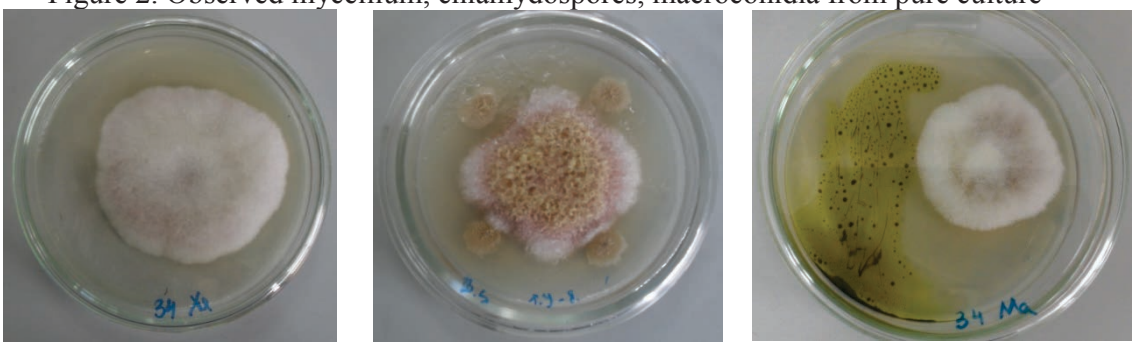


a. Pure culture



b. Mycelium, chlamydospores, macroconidia

Figure 2. Observed mycellium, chlamydospores, macroconidia from pure culture



a b c

Figure 3. *Fusarium* spp grown on PDA with *Bacillus subtilis* 26D strain biopesticide and 1.5% Matrine & Osthole As
(a) Control
(b) *Fusarium* spp grown on PDA with *Bacillus subtilis* 26D strain
(c) *Fusarium* spp grown on PDA with 1.5% Matrine & Osthole As

CONCLUSION

1.Based on our research *Fusarium* spp fungal disease has spread through forest regions near Ulaanbaatar city. Out of Sixty nine samples *Fusarium* spp is found from three samples in Ar zaisan, Taivan uul and Jigjid areas.

2.In this study some results have shown that *Bacillus subtilis* 26D strain was effective against *Fusarium* spp whereas 1.5% Matrine & Osthole AS wasn't as effective as we've hoped against entomopathogenic *Fusarium* spp.

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