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# ON THE FORMATION OF MICROBOTSENOZISES IN THE RHIZOSPHERE OF ANTHROPOGENIC-COMPACTED SOD-LAYERED SOILS

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*It is shown that the cells seal sod-layered soils, including microbosenosis rhizosphere dominated by potentially pathogenic micromyceta (Fusarium, Alternaria, Coniothirim, Oomycetes), and the number of saprophytic fungi (Penicillium, Trichoderma, Acremorium), which can reduce the pathogenic background is reduced, which negatively impact on the sanitary condition of plant communities.*

Soil, recreation, timber plants, rhizosphere, micromyceta, fungi.

Recreational stress experienced by forest ecosystems near large cities leads to a significant compaction of the surface layers of soil. Under the influence of trampling seen a significant deterioration in water-physical properties, increasing bulk density and decreasing duty cycle of soil [12] and despite the fact that significant compaction exposed only the upper 15-cm segments of negative impacts undergoing whole thickness of rhizosphere [10, 14]. In particular, soil compaction violates not only their structure [13], but also adversely affects the productive moisture content [4], the rate of absorption [2], which causes deterioration of the aeration hole [3] and leads to changes in the processes of growth physiologically active roots leaves and shoots of woody plants. Also found that in the case of soil compaction in the leaves of woody plants reduced the amount of inorganic forms of potassium, there is accumulation of inorganic forms of sulfur and chlorine [8] and loamy layers with a density of more than 1.4 $g \cdot cm^{-3}$ barely populated physiologically active roots. Biological and enzyme activity of soil are changing as well [11] and there is a changes in microbosenosis of rhizosphere . To date it’s established [6] that the species composition of fungi that inhabit the soil in Ukraine has more than 130 species, and the differences in their species composition is not related to soil moisture, content of humus, phosphorus and potassium are mainly dependent on the acidity soils and content of nitrates and carbonates [5]. Specified as a stimulating effect on the fungi genus *Aspergillus, Penicillium, Trichoderma* growth of crops [9]. The lack of information on the development and environmental role micromiceta on soils that are subject to the influence of the recreation and led this study.

**The aim of research** – to find out the effects of anthropogenic soil compaction on the formation microbosenosis featuring fungi.

**Materials and methods research.** The objects of study served as sod-layered light- loamy soil composition, formed under the 160-year old stands of oak (*Quercus robur* L.), which grows in the Bila Tserkva city on the second terrace of the right bank of the Ross River. Oak stands growing under growth class I and class for the test was 0.6 units of composition. In the undergrowth that grows in clumps area, dominated by elderberry (*Sambucus niqra* L.). In grass cover dominated couch (*Elytriqia repens* L.) examined soils undergo varying degrees of degradation , and therefore as a research object was selected cell Groot, lost herbaceous vegetation due to heavy load and recreational complex traits belonging to 5 habitats degradation [14]. As a control, served as a forest area with no visible signs of degradation of ground vegetation. Content fungal flora in stand rhizosphere and their mean values were determined and calculated involving existing techniques [1, 7, 15 ].

**Results of research**. Soil compaction causes undesired species composition microbosenosis specific to forest communities and encourages the development of pathogenic species. In particular, potentially pathogenic micromicetes that belong to the genus *Fusarium* ( Table 1) and are able to affect woody plant root rot. Species of this genus inhabit compacted sod-layered soil to a depth of 40 inches, and not compacted soils mature oak stands were observed only in the upper 10-cm layer (2.6 thousand CFU·$g^{-1}$ is based on absolutely dry soil).The content of this pathogen in upper 10-cm layer of compacted soil in 2.1 times greater than in areas where the soil has not undergone consolidation. Deep rhizosphere fungi decreased and the number of 30-40-cm depth reached minimum values (0.55 thousand

CFU·g$^{-1}$ is based on absolutely dry soil). It should also be noted that in the upper 10-cm layer of compacted soil we were also recorded presence micromisetes which belong to the genera *Alternaria* sp. and *Coniothirim* sp. in plants and cause leaf spot and to the kind of *Oomycetes* sp., which can cause root rot. Their number reached 2.65 thousand CFU·g$^{-1}$ is based on a completely dry soil, which certainly complicates the pathogenic state in the cells of recreational impact on phytocenosis.

**1. The number of fungi of the genus *Fusarium spp*. in sod-layered soil th.· CFU·g$^{-1}$ is based on a completely dry soil**

| The depth of sampling, cm | Forest areas with soil: | |
|---|---|---|
| | not-compacted | compacted |
| 0–10 | 2,60 | 5,47 |
| 10–20 | not found | 1,28 |
| 20–30 | not found | 0,77 |
| 30–40 | not found | 0,55 |
| 40–50 | not found | not found |

In cells seal sod-layered soils we observed decrease in the number of saprophytic micromicetes (Table 2 ), which can reduce the pathogenic background and increase biochemical activity of soil. In particular , the content micromicetes in upper 50-cm layer of compacted soil decreases and reaches for the genus *Penicillinum* sp. only 0,4-9,8 %, and for members of the genus *Trichoderma* sp. - 16,0-52,6 % of their content y soil, which has not undergone recreational exposure. Maximum number of *Penicillinum* sp. is observed in the upper 10-cm soil layer studied both in not-compacted (172.32 th. CFU·g$^{-1}$) and in seals ( 13,02 th/ CFU·g$^{-1}$) cells , and the minimum (0.51 th. CFU·g$^{-1}$) - was observed in 10-20-cm layer, which is undergoing the largest influence in the anthropogenic pressures. Maximum number of *Trichodermu* sp. also characteristic of the upper 10-cm layer of sod-layered soils. However, its size in not-compacted soil was 33 times less than the number *Penicillinum* sp. and amounted to 5.21 th. CFU·g$^{-1}$, and compacted soils, stood at 2.74 th. CFU·g$^{-1}$, which is 52.6% of their strength under control. Minimum number of saprophytes (0.25 th. CFU·g$^{-1}$) was observed in 30-40-cm layer of compacted soil.

In degraded soils, also, there is a suppression of micromicetes such as - *Acremorium* sp. (0.30 th. CFU·g$^{-1}$) and *Mirothecium* sp. (0.25 th. CFU·g$^{-1}$), which is 9,5-11,3% of the number of microorganisms y soils that have undergone human compaction.

**2. The number of saprophytic micromicetes in sod-layered soil th. CFU·g$^{-1}$ is based on a completely dry soil**

| The depth of sampling, cm | *Penicillinum sp.* | | | *Trichoderma sp.* | | |
|---|---|---|---|---|---|---|
| | soil: | | | | | |
| | not-compacted, control | compacted | % relative to control | not-compacted, control | compacted | % relative to control |
| 0–10 | 172,32 | 13,02 | 7,6 | 5,21 | 2,74 | 52,6 |
| 10–20 | 121,95 | 0,51 | 0,4 | 1,86 | 0,77 | 41,4 |
| 20–30 | 137,57 | 4,11 | 3,0 | 1,62 | 0,26 | 16,0 |
| 30–40 | 108,01 | 1,27 | 1,2 | 1,58 | 0,25 | 15,8 |
| 40–50 | 39,64 | 3,90 | 9,8 | 3,44 | 0,90 | 26,2 |

It should also be noted that in the upper 30-cm layer of compacted soil, there was not characteristic of the soil saprophyte not-compacted *Stachybotrus* sp. number on which the test was located within 0,77-5,38 of th. CFU·g$^{-1}$is based on a completely dry soil.

## Conclusion

Consequently, seals sod-layered soils is due to anthropogenic stress leads to a redistribution of species composition and quantity of fungi that inhabit the soil of forest communities. In cells consolidation among microbosenosis rhizosphere dominated by potentially pathogenic micromyceta (*Fusarium*, *Alternaria*, *Coniothirim*, *Oomycetes*), and the number of saprophytic fungi (*Penicillinum*, *Trichoderma, Acremorium*), which can reduce the pathogenic background is reduced, making it difficult to pathogenic state in plant communities.

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