

## INFLUENCE OF INDUSTRIAL POLLUTION ON WILD GROWING PLANTS IN DEPEND ON TYPE OF BIOCENOSES

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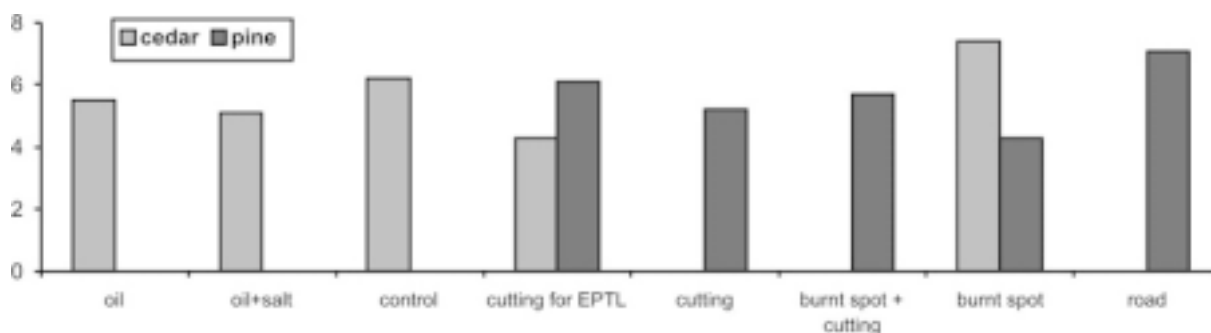
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**Key words:** biocenoses, industrial pollution, photosynthetic pigments, wild plants

Study of action of different anthropogenic factors on photosynthetic apparatus of wild plant species which one determined plant productivity was carried out in middle taiga subzone of Tjumen region of Russia. Changes of photosynthetic apparatus of agricultural plants are well studied, but not for wild plant species. Main anthropogenic pressure on forests in the area of investigation is connected with intensive development of oil producing industry (mechanical cutting of trees when industrial objects are build, chemical pollution and drying of territory and so on) (Zakharov et al., 1998), and with forest fires, when large areas of high productive forest lands were damaged (Podshivalov et al., 2000). Industrial cutting are not so large on its scales, but a lot of trees is cut out at the device of oil-fields, laying of roads, building of area plants of oil extracting. Forest biocenoses of pine and cedar forests, and sphagnum peat were chosen as objects under investigation. During summer of 2001 some forest places, transformed under influence of different anthropogenic factors (chemical pollution of territory by oil producing industry, cuttings, cuttings down of an electric-power transmission line (EPTL), burnt spots), and control undisturbed places were investigated. The estimation of photosynthetic pigments was conducted in acetone extracts of green leaves (Shlyk, 1971). We studied content of photosynthetic pigments (chlorophyll and carotenes) in leaves of some taiga berries bushes and trees: *Vacciniaceae* family: cowberry (*Vaccinium vitis-idaea* L), cranberry (*Oxycoccus quadripetalus* Gilib), European blueberry (*Vaccinium myrtillus* L.), *Ericaceae* family: ledum (*Ledum palustre* L.), *Pinaceae* family: pine (*Pinus silvestris* L.).

The obtained materials allow us to made next conclusions.

Species: *Pinus silvestris* L. Maximum content of pigments in cedar (fig. 1) was at “burnt spot” place and was 19% higher then control.

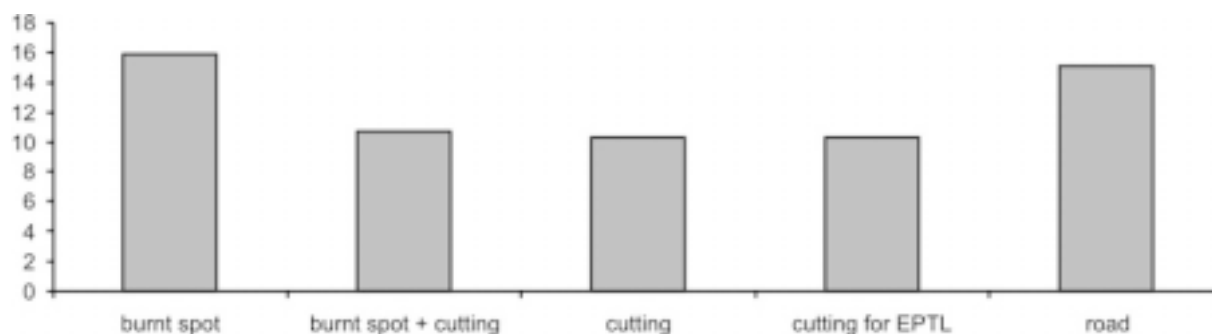


**Figure 1.** Chlorophyll content (mkg/g of dry matter) in needle of a pine under different kinds of anthropogenic pressure (in pine and cedar forests)

A minimum content was at “cutting for EPTL” place, 30% lower then control. In pine forest “cutting for EPTL” lead to increasing of pigments content by 1.5 times as referred to cutting in cedar forest. In pine forest the lowest content of pigments was at “burnt spot” place, the biggest – at “road” place.

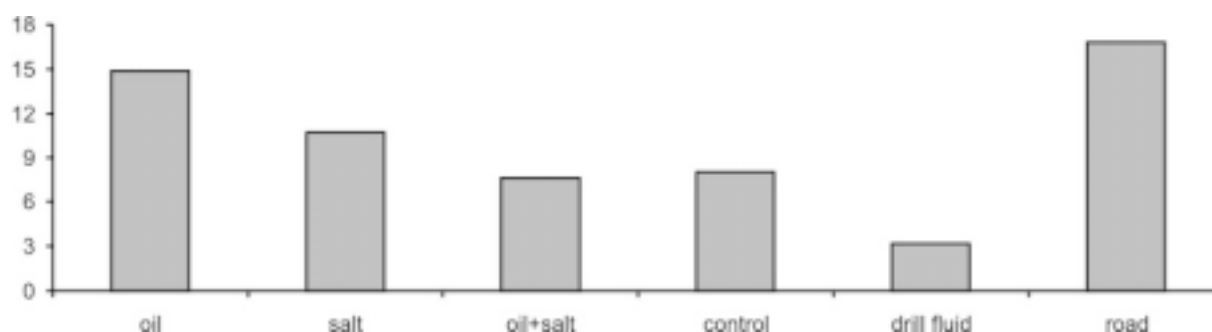
Species: *Vaccinium myrtillus* L.

If content of pigments in leaves of blueberry (figure 2) on cutting was referred as 100 %, then under influence of factors “burnt spot” and “road” its increased about 1.5 times both for chlorophylls and for carotenes.



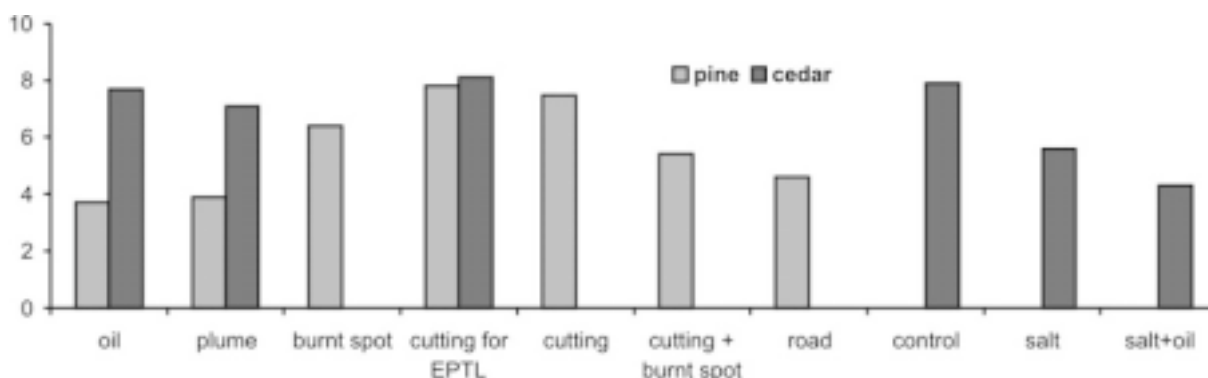
**Figure 2.** Chlorophyll content (mkg/g of dry matter) in leaves of blueberry under different kinds of anthropogenic pressure (pine forest)

Species: *Oxycoccus quadripetalus* Gilib At the place “sphagnum peat” in cranberry leaves (figure 3) there was next regularity (in comparison with control place) of change of pigments content: under action of factor “drill fluid” pigments content decreased by 60%, under action of “salt + oil” its decreased slightly only. But as a single factors “salt” and “oil” lead to significant increasing in content of investigated pigments: “salt” – by 30%, “oil” – by 80%. Factor “road” increased pigments content twice.



**Picture 3.** Chlorophyll content (mkg/g of dry matter) in leaves of cranberry under different kinds of anthropogenic pressure (sphagnum peat)

Species: *Vaccinium vitis idaea* L. In cedar forest (figure 4) factors “oil” and “cutting for EPTL” practically did not influenced on pigments content in comparison with control place.



**Figure 4.** Chlorophyll content (mkg/g of dry matter) in leaves of cowberry under different kinds of anthropogenic pressure (pine and cedar forests)

But all the other factors lead to decrease in its content. Factor “oil + salt” had the biggest influence on investigated pigments content, decreasing it twice. Factor “salt” solely decreased pigments content by 30%. Factor “plume” had very low influence about 10-15% only.

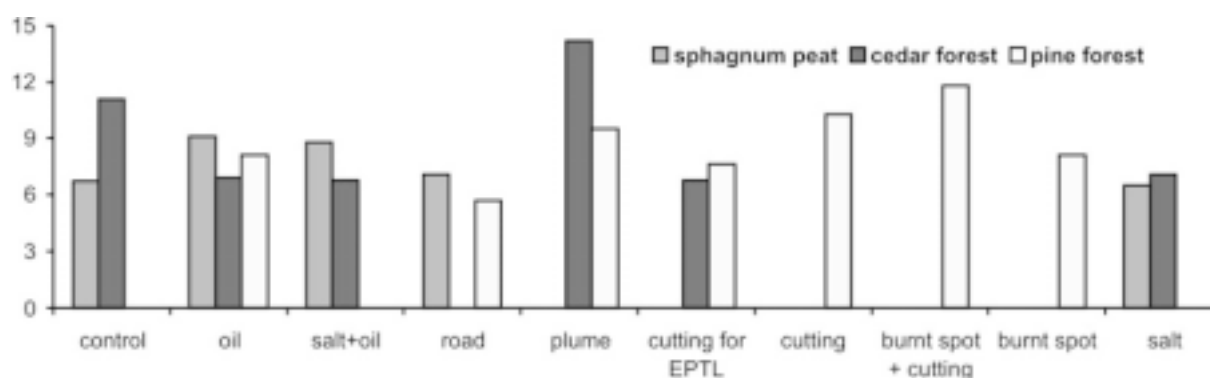
In pine forest factor “cutting for EPTL” acted only 5% weakly then in cedar forest. When compare action of two factors “oil” and “plume” in these two biotopes, then in pine forest its action lead to twice decreasing of pigments content in compare with cedar forest.

Species: *Ledum palustre* L.

Under condition of sphagnum peat (figure 5) factors “road” and “salt” had not influence on change of investigated pigments, but factors “oil” and “oil + salt” increased content of these pigments by 30%. The equal degree of influence of these two factors and absent of action of “salt” solely could indicate that influence on photosynthetic apparatus of ledum had only oil.

In cedar forest only factor “oil” lead to increase of pigments content (by 20-25%), all the other factors decreased it. Action of “salt”, “oil + salt”, “oil”, and “cutting for EPTL” were equal qualitatively (35-40% decreasing).

When we compare the action of some factors in different biotopes then we saw that factor “salt” in cedar forest had more strong influence than in the condition of peat, “salt + oil” – contra verse, It must be pointed out that action of “oil” had no difference in different biotopes, but in control condition of cedar forest content of pigments was 65-70% higher, than in peat. The action of “oil” and “road” in pine forest lead to lower content of pigments in leaves (10 and 20%, correspond) than in peat. Under action of “oil” and “cutting for EPTL” in pine forest plants had higher level of pigments content, than in cedar forest.



**Figure 5.** Chlorophyll content (mkg/g of dry matter) in leaves of ledum under different kinds of anthropogenic pressure (pine and cedar forests, sphagnum peat)

Thus undertaken investigation indicated that reaction of photosynthetic apparatus of wild growth plants in different phytocenoses were differed significantly. Such plant species as pine, cranberry, cowberry, ledum were the most susceptible to pollution under action of different anthropogenic factors: oil, oil + salt, drill fluid. The most negative influence on plant productivity of living aboveground cover had chemical pollution of territory by oil producing industry, leading to significant decreasing of photosynthetic pigment content in leaves of wild growing plants in different biotopes of middle taiga of Russia.

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