BULGARIAN DATA

ACCOMPANYING REPORT

Sampling and Analysis of Needles and Leaves

In order to implement the planned activities and apply the new methodological approaches, the project has been implemented at 3 field stations – Yundola, Vitinia and St. Oriahovo. Intensive collection of leaf samples of Fagus sylvatica, Picea abies and Quercus frainetto has been carried out. Samples per functional groups of plants have been taken to determine the biomass.

- **Collection and analysis of leaf and needle samples**

The sampling frequency is once per month of the vegetation season. The number of trees sampled and analyzed for each station is 5. The determination of the dry mass of 100 leaves or 1000 needles was done by drying at 105 ^{0}C.

The sampling, carried out during each month of the vegetation season, and the subsequent statistical analysis of the results have shown that the appropriate time for collection of samples by elements is the following: total N in the three field stations – August, total P – August for the Hungarian oak from Staro Oriahovo field station and two-year-old needles of Norway spruce in Yundola field station, for common beech and one-year-old needles of Norway spruce – July; K – June for common beech in Vitinia field station and Hungarian oak in Staro Oriahovo field station, for one-year-old needles of Norway spruce in Yundola field station – August, and for the two-year old needles – April; Ca - August, excluding the two-year-old needles of Norway spruce, for them the most appropriate time is April; Mg – August, excluding the two-year-old needles of Norway spruce, for them the most appropriate time is June.

The samples of leaves and needles were analyzed for all mandatory parameters except Mg (technical problem) and some optimal parameters as follow:

Sequence number	Parameter	Units	Standardized internal methods for analysis
1	2	3	4
1.1	**K**	mg/g	XR – x-ray fluorescence spectrometry
1.2	**Ca**	mg/g	XR – x-ray fluorescence spectrometry
1.3	**S**	mg/g	XR – x-ray fluorescence spectrometry
1.4	**Ntot.**	mg/g	ISO 11261
1.5	**P**	mg/g	ISO 11466
1.6	**Mn**	µg/g	XR – x-ray fluorescence spectrometry
1.7	**Fe**	µg/g	XR – x-ray fluorescence spectrometry
1.8	**Cu**	µg/g	XR – x-ray fluorescence spectrometry
1.9	**Zn**	µg/g	XR – x-ray fluorescence spectrometry
1.10	**Pb**	µg/g	XR – x-ray fluorescence spectrometry

- **Leaf analysis**

The comparative assessment of the analyzed macroelements in **Vitinia** field station, carried out in 2009 and 2010, showed that in the leaves of the common beech the content of all elements was increased, except for the Ca content, which was decreased. In accordance with to the adopted regional boundaries, the content of total N and Mg in 2010 was above the established limit of optimal values. The general assessment of the nutrition status is that as a whole, despite some differences in the limits of minimum and maximum values, it is balanced.

In **Staro Oriahovo** field station, the comparative assessment of the analyzed macroelements in the leaves of Hungarian oak, carried out in 2009 and 2010 at both sampling areas – the old (2009) and the new (2010), showed that the K

content had lower values in the new sampling area, but at still at levels, sufficient for the normal functioning. The values of Ca in the new sampling area were considerably lower, but the also were within the limits of the regional values. The other elements – total N and total P, had considerably higher values in the new sampling area, but slightly above the optimum limit. The general assessment of the nutrition status is that, as a whole, it is balanced.

In **Yundola** field station, the comparative assessment of the analyzed macroelements, carried out in 2009 and 2010, showed that for the one-year-old needles, the content of total N and total P was increased and exceeded the optimal value. Except for the P content in the two-year-old needles, which value did not differ from the last year values, the content of the rest analyzed elements was decreased below the minimum limit. The general assessment of the nutrition status regarding the analyzed elements is that, as a whole, it is balanced.