SHORT TERM SCIENTIFIC MISSION

FOREST INVENTORY CONCERNING BOSNIAN BEECH COPPICES AND COMPARISON OF THE DATA COLLECTED WITH SIMILAR SITUATIONS IN CENTRAL ITALY

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STSM Scientific Report

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1. PURPOSE OF THE STSM

The main goal of the Short Term Scientific Mission (STSM) was to collect data in Bosnian beech coppice stands using an innovative tool for forest inventory (Field-Map technology) under the supervision of the University of Sarajevo, Faculty of Forestry, to assess the potential of this tool for detecting coppice stands and old-growth forest attributes (stem position, crown profiles, deadwood, etc.) in order to evaluate and propose alternative management solution comparing these "new" collected data with the ones already available from previous studies on Italian beech coppice stands, carried out in similar situations during my research activity for DIBAF Dep., University of Tuscia.

2. DESCRIPTION OF THE WORK CARRIED OUT DURING THE STSM

The work has been focused in collecting data using Field-Map technology in two different locations selected by the staff of the Faculty of Forestry, University of Sarajevo.

Field-Map is a portable computer station that is able to realize quickly topographic and dimensional surveys of the forest stand. The tool provides a real-time geo-referenced graphic visualization (like a common GIS) about stem positions and every forest attributes collected (dbh, height, crowns, etc.) using survey devices (distance meter, compass, GPS, etc.) directly linked to a computer (Fig. 1 and 2).

Two different study areas were selected: the first one is located on Ravna Vala, Igman mountain, 15 km SW from Sarajevo (Fig. 3); the second one is a 60 years-old coppice beech forest stand located on the site of Musići, near to Hadžić (10 km west from Sarajevo) (Fig. 4).

Surveys were carried out within one square permanent sample plot (100 m x 100 m side, 1 ha of surface) in each location. The following attributes using Field-Map technology were collected:

- geo-referenced stem position (MKI Balkans 6 reference system);
- diameter at breast height for each trees with a 5 cm threshold;
- height (m);
- tree species;
- crown profiles;
- crown projection;
- deadwood (type – dead trees, snags, stumps, etc. and decomposition degree).

About 15 days were spent in field to collect data in both the sample plots.

Subsequently, it was possible to calculate other dendrometric parameters like: number of stems per hectare, basal area, volume, biomass and carbon stocked.

These collected data have been analyzed and compared with data already achieved in Italy for two similar beech stand situations.

The first situation used for the comparison is a beech stand located within the National Park "Gran Sasso and Monti della Laga", Abruzzo Region, Central Italy. The stand has a similar complex structure as Ravna Vala characteryzed by the presence of several large trees, significant amount of deadwood and different stages of tree regeneration. Surveys were carried out using Field-Map within one square permanent sample plot.

The second area is a 65 years old beach coppice stand located along the northern facing slope of Mount Nuria, in the western part of Latium, Central Italy where data have been collected in twelve 900 m^2 square plots (1.08 hectare in total) characteryzed by three different thinning intensities from below and an unthinned control treatment (three repetitions for each treatment). Also in Musići trees were selected within the sample plots in order to evaluate in time the response of the stand to different treatments.

3. MAIN RESULTS ACHIEVED

The main products for both the stands are georeferenced shapefiles with the position of the single stems, crown projection, crown profiles, deadwood position, etc. Figure 5 shows a GIS visualization of stem position and crown profile for Ravna Vala stand. The other stand attributes measured (§ 2) are coupled as metadata within the shape files, providing immediately a quick and high accuracy of the stand structure. The first result is a "snapshot" of the forest stand that can be used as a starting point for an accurate monitoring of the evolution of the stand (position of the gaps, location for natural regeneration, etc.). Through the integrated GIS in the station it is possible to observe in real-time the situation while surveys are carried out, allowing to check immediately the completeness and the consistency of the data collected.

Following, some datas of the two investigated stands are reported, showing a fully different forest stand structure:

a) Ravna Vala

- Number of alive stems 832 n ha^{-1}
- Number of alive stems with dbh > 70 cm 47 n ha^{-1}
- Biggest diameter found 127 cm
- Highest height measured 50 m

b) Musići

- Number of alive stems 653 n ha^{-1}

- Number of alive stems with dbh > 70 cm 0 n ha^{-1}
- Biggest diameter found 24 cm
- Highest height measured 24 m

Ravna Vala stand (BiH) have been compared with Fonte Novello (Italy), and Musići (BiH) with Monte Nuria (Italy). Following are reported some "quick" results of the comparison:

- Ravna Vala stand has an higher number of tree species than Fonte Novello where only broadleaves where found;
- Fonte Novello has a less number of alive trees and of alive trees with dbh > 70 cm;
- Ravna Vala has trees with highest height but Fonte Novello has larger trees (the maximum dbh measured was 150 cm);
- Musići and Monte Nuria are very similar in almost all auxo-dendrometric parameters but Monte Nuria has an higher number of tress per hectare with a slimmer mean dbh and lower mean height.

It was decided that further and more interesting results provided during the STSM and carried out by the comparison will not be shown in this report because they will be used in a paper which will involve both the staff of the two universities (§ 4).

Therefore, the main advantages of the experimentation carried out using Field-map are:

- this technology allows to collect a large amount of information in relatively short time if compared with the classic way to carried out surveys;
- the data are collected directly as layers (shapes, tables) that can be interfaced with any GIS software;
- it is possible to process immediately, directly in the stand, the detected datas (number of stems per ha, basal area, diametric distribution curve, ipsometric curve, etc.).

Finally, the following targets of the STSM have been accomplished:

1. comparing experiences, different silvicultural managements and data achieved from similar beech coppice stands in Bosnia & Herzegovina and Italy;
2. use an innovative tool to collect data in forest stands (Field-Map technology) in order to analyze coppice stands with the aim of enhance harvest productivity, soil conservation, biodiversity, etc. at various scale;
3. use the results achieved with this STSM to ensure a continuity in the collaboration between the two universities involved (§ 4).

4. FORESEEN PUBLICATIONS/ARTICLES RESULTING FROM THE STSM AND FUTURE COLLABORATION WITH HOST INSTITUTION

It is intended that all the collected data and information carried out during the STSM will be included at least in one paper which will be published together by the staff of the two Universities involved.

The host institution also agrees to start a partnership with DIBAF Dep., University of Tuscia, using as a first step the collaboration started with this STSM.

5. LIST OF FIGURES

FIGURE 1 – Calibrating Field-Map compass before collecting data

FIGURE 2 – The screen shows in real-time the data collected by Field-Map

FIGURE 3 – Ravna Vala forest stand

FIGURE 4 – Aged coppice beech stand in Musići

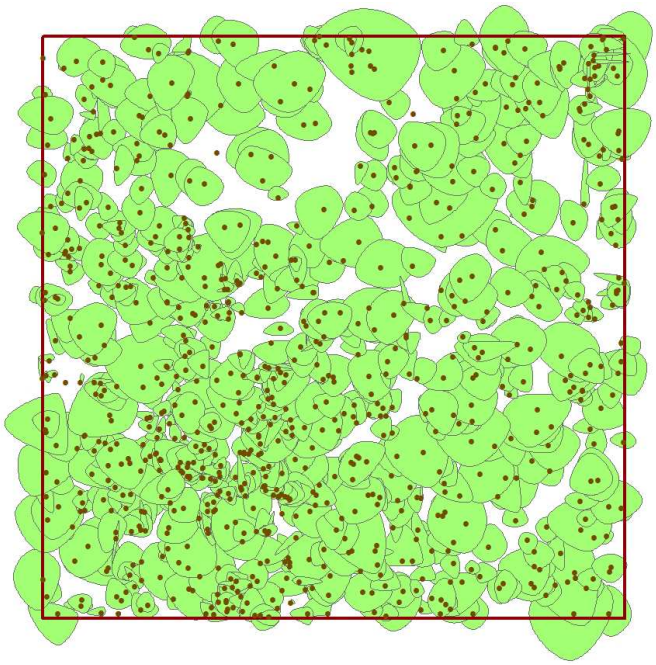

FIGURE 5 – GIS visualization of stem position and crown projection in Ravna Vala

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