Effect of climate changes on the species composition and productivity of plant communities in Cukurova Plain.

Vegetation Sub-Group Progress Report

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1. Introduction

Climate changes, especially precipitation and air temperature in semi –arid areas affect on the quality and quantity of vegetation. We investigate vegetation in Cukurova Plain and make the vegetation maps, and then estimate productivity in this region. We simulate the impact of climate change on composition and productivity of the vegetation, and water budget in Cukurova Plain in future using by the results above mentioned.

Expected outcomes of the Sub-Group until March, 2007 is as follows;

a: to estimate species composition and productivity of vegetation in Cukurova Plain

b: to estimate and simulate changes of vegetation in Cukurava Plain by global climate change

c: to estimate water budget in Cukurova Plain in future

and in the fiscal year 2003-2004 (until the end of March, 2004) is;

a: to make vegetation maps in Cukurova Plain

b: to analyze vertical distribution of vegetation in this area

c: to analyze stand structure in sample plots.

2.Methodology and Materials

Geographical vegetation in Cukurova Plain will be analyzed using by satellite photographs and we make the vegetation maps. We will set sample plots for investigation of vegetation in every 200m altitude and analyze vertical distribution for dominant species in this region. Soil property in the sample plots will be investigated.

Biomass will be estimated in three typical vegetations, which are maquis, Pinus brutia and Abies/Cedrus forests, and measure photosynthesis and

transpiration for the dominant species. Changes of species composition and productivity of plants communities in Cukurova Plain will be estimated from results above mentioned.

3.Results

a. Vertical distribution of dominant species

Original vegetations in Cukurova Plain were markedly disturbed by anthropozoic pressure up to 600m in altitude except conservation areas. Coastal forests along Mediterranean Sea were dominated by Maquis species and *Pinus halopensis.*

Up to 600m in altitude dominat species were *Pinus brutia* and *Arbutus andrachne* with Maquis and *Quercus* species and most of these areas were used as cultivated land.

From an altitude of 600m up to 1000m most of forests were occupied by artificial ones dominated by *Pinus brutia.*

In Alpine zoon more than 1000m in altitude coniferous forests were distributed and were composed of *Abies cillcica, Cedrus libani, Pinus nigra* and *Juniperus oxycedrus.*

Among these species habitat segregation was exhibited and *A.cillicica* was distributed on all these areas. *C.libani* was a pioneer species of *A.cillicica* forests and *J.oxycedrus* was dominant on rocky and south facing slope. *P.nigra* had a habitat in relatively higher altitude among these species and mainly remained on north facing slope.

All regions investigated belonged to semi-arid area analyzed by Thornthwaite's *p/e* Index, and Aladag-Abies and Adalag/Cedrus sites (see Fig.1 in Stand structure of plant communities in Cukurova Plain.Tamai et al.) were classified into cool temperate zone and the others into warm temperate one by Warmth Index.

Climate changes not only affect on species composition but also on plant productivity. Plant growth was restricted to be lower than the potential growth by chemical and physical factors like poor or low moisture soil in semi-arid areas. We estimated the potential tree height of *P.brutian* in different sites (Fig.1) and the result suggested that the maximum value of *P.brutia* in Karaetepa was not the potential one for this species and will become higher if climate conditions or soil property will be changed to suitable for their growth.

4.Further research

First of all we should get or make vegetation, soil maps and meteorological data in Cukurova Plain, and analyze them. From the results above mentioned we estimate pant community productivity by harvest method in each community in Cukurova Plain.

We will investigate biomass in sample

sites and measure physiological aspects of dominant species in Cukurova Plain in the following two years.

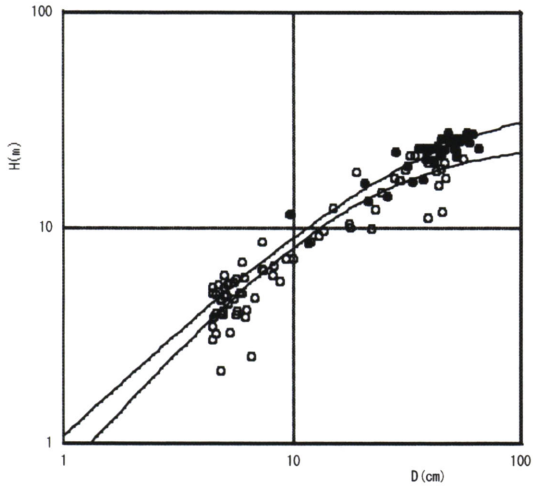

Fig.1 Relationships between tree diameter(D) and height(H) for *Pinus brutia* in Adalag(○) and Karetepe(●)