Stand structure and characteristics of tree growth in plant communities of the eastern Mediterranean region, Turkey

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1. Introduction

Climate changes strongly affect on stand structure and growth of plant community. But impacts on standing structure and the growth involve two factors, which are instinct and external one for plant; besides external factor comprises impacts by anthropozoic and environmental pressure. We collected data to analyze impacts by anthropozoic pressure in these two years, and we begin to analyze relationships between annual growth of trees and precipitation in this year.

2. Investigated sites

We selected 7 sites for investigation of vegetation in the eastern Mediterranean region of Turkey (Fig.1). Outlines of vegetations and environmental characteristics in this region were already explained in the report last year . Plot 1and 2 were dominated by *P.brutia* and Plot 7 was by maquis species. The remaining 4 plots were situated in sub-alpine zone and Plot 3 was at the timber line of the mountain more than 2000m altitude. .

Open circles and solid triangles on the map show sites investigated in year 2003 and 2004, respectively.

3. Species composition and stand structure

Plot 7 was primary maquis stand in the campus of Cukurova University and stand height was remarkably low (Table 1). It is very difficult to find primary high maquis stands in this region because of sever disturbance by human beings, and which is a difficult reason to estimate the climax community in future and more or less affected on stand structure and productivity in all sites we investigated.

Fig.1 Study areas

Even though in a sub-alpine forest standing crop did not attain to the climax stage judging from the species composition in larger size in Figure 2. *Cedrus libani* is a pioneer species and *Abies cillicica* is a climax component in this area and pioneer species dominates still in species composition.

In tree diameter-height relationship height value usually get saturated one at biggest diameter. But we could not obtain such a relationship in investigated sites (Fig.3). We should more analyze the result, which was caused by mortality characteristics for these species or environmental factor.

Table 1. Species composition in investgated plots

Plot	1				2				3				4			
Species	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)
Cistus creticus																
Daphne ericica																
P.brutia	808	19.9	11.71	32.5385	719	8.1	5.34	8.7246								
Phillyrea latifolia																
Pistacia terebinthus																
Quercus coccifera																
Arbutus andrachne	24	3.9	3.45	0.0009												
Myrtus communis	24	3.3	3.65	0.0010												
Phillyrea latifolia	95	3.7	2.77	0.1153												
P.nigra									654	21.3	8.14	37.2597	535	21.9	5.67	78.0131
Cedrus libani																
Abies cilicica																
Thuja orienralis																
Total	951	17.4	10.41	32.7077	719	8.1	5.34	8.7246	654	21.3	8.14	37.2597	535	21.9	5.67	78.0131

Plot	5				6				7			
Species	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)	N (/ha)	Mean D (cm)	Mean H (m)	Basal area (m2/ha)
Cistus creticus									85	0.9	1.85	0.0080
Daphne ericica									85	0.6	1.80	0.0038
P.brutia									85	4.7	3.12	0.2046
Phillyrea latifolia									509	0.8	1.60	0.0388
Pistacia terebinthus									254	1.0	1.99	0.0308
Quercus coccifera									2205	2.1	2.42	1.2836
Arbutus andrachne												
Myrtus communis												
Phillyrea latifolia												
P.nigra	98	21.1	14.92	4.3087	205	19.9	12.68	9.1649				
Cedrus libani	468	28.3	19.09	33.1448	181	25.0	15.64	12.3709				
Abies cilicica	98	10.0	6.29	0.9846	567	16.0	10.16	14.7665				
Thuja orienralis					72	24.3	10.30	4.8816				
Total	665	24.5	16.57	38.4381	1026	19.0	11.64	41.1840	3223	1.8	2.25	1.5696

N:number of trees

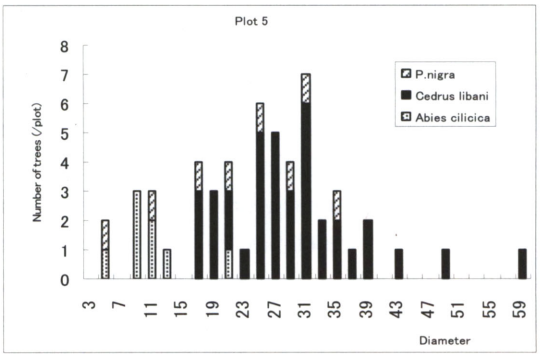

Fig. 2 Diameter distribution

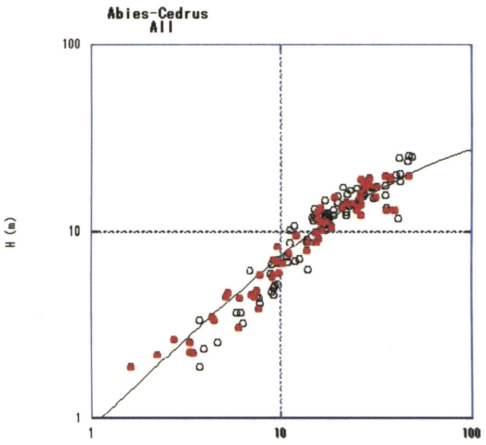

Fig.3 Diameter-height relationships

4. Tree growth and precipitation

Geographic distribution of plants is mainly dependent upon temperature and water factors in the community. Precipitation scarcely affects on ecological productivity for a plant community except in arid and semi-arid areas. But productivity in an ecosystem linearly increases with increase of

precipitation until about 1000mm/yr.

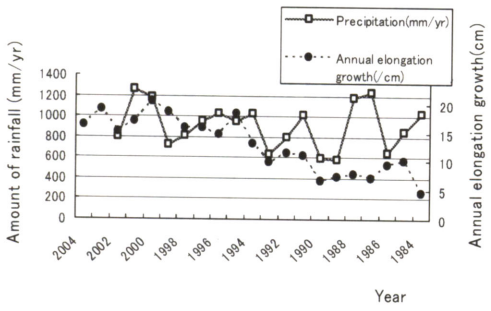

Fig.4 Annual elongation growth and precipitation in Plot 2.

Annual growth was higher when annual precipitation was more than 1000mm in the previous year and lower in case of having less than around 800mm/year in that year.

This result might be caused by the mechanisms that elongation growth of genus *Pinus* grew using by energy stocked in the previous year, and smaller rainfall and higher air temperature made net production of trees lower.

5. Conclusion

Vegetation in the eastern Mediterranean region of Turkey was severely disturbed by anthropozoic pressure and it is very hard to estimate vegetation in the past.

Vegetation in this area should be analyzed to separate anthropozoic factor and the others that are environmental one and instinct characteristics of plant.

Annual tree growth in this area was strongly affected by climate factors, especially precipitation. The changes of growth might reflect the precipitation fluctuation in rather small area. We more collect data for tree growth and long term metrological ones and are trying to apply the result to analysis of precipitation changes in smaller areas.