Stand structure of plant communities in Cukurova Plain

Shigenobu TAMAI[1], Makoto ANDO[2], Junji SANO[3]

[1] Arid Land Research Center, Tottori University,1390 Hamasaka, Tottori, 680-0001, JAPAN

[2] Field Science Education and Research Center, Kyoto University, Kitashirakawa, Sakyo-ku, Kyoto, 606-8502, JAPAN [3] Forest Ecology and Ecosystem Management Laboratory, Tottori University Forests, Faculty of Agriculture, Tottori University, 4-101 Koyama-minami, Tottori 680-8533 JAPAN

e-mail:[1] tamai@alrc.tottori-u.ac.jp, *[2]* ando@kais.kyoto-u.ac.jp, *[3]*jsano@muses.tottori-u.ac.jp

1. Introduction

Vegetation distribution in the world is districted mainly by climatic factors, of which air temperature and precipitation most strongly affect on the distribution in quality and quantity. The vegetation is changed in time by action of environments composing the ecosystem, and the environment is also changed by reaction of plants in the ecosystem, but in relatively small area, species composition is affected by soil property in the ecosystem.

At the beginning of the investigation we tried to analyze species composition and stand structure of plant communities in present of Cukurova Plain to estimate them in past and future.

2. Investigated sites

We selected 7 sites for investigation of vegetation in Cukurova Plain (Fig.1). Vegetations between 0-600m in altitude were almost destroyed or disturbed by anthropozoic pressure and then in this area investigation sites were made in conservation area or national park (Yumurtalik, Cataran,Karetepe-Mille Park and Karetepe-Maquies in Table 1).

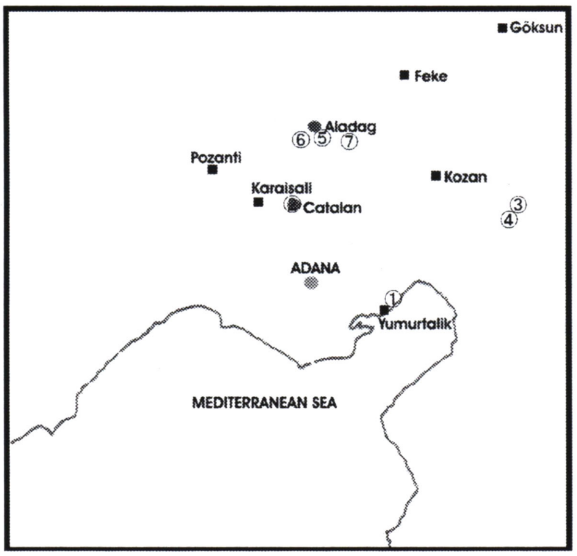

Fig.1 Study areas

Number on the map shows investigated site in Table 1.

Remaining 3 sites were in natural forests. All sites investigated in this time were classified to semi-arid area estimated by Thornthwaite's *p/e* Index, and Aladag-Abies and Adalag-Abies/Cedrus were in cool temperate zone and the others in warm temperate zone by Warmth Index (Kira 1976).

3. Species composition and stand structure

Yumurtalik site was coastal forest on san dune and belongs to conservation area for

Table 1. General description of the investigated sites

Site	Altitude (m)	Directionm of slope facing(°)	Angle of slope(°)	Plot size (m)	Tree density (no/ha)	D mean (cm)	Basal area (m2/ha)	H mean (m)
①Yumurtalik	0	N50W	2	50x40	185	22.2	8.92	5.5
②Cataran	151	N40W	10	20x20	1726	18.69	64.85	8.69
③Karetepe-Mille Park	200	N41E	21	30x20	1267	15.63	45.94	4.37
④Karetepe-Maquis	530	N30W	21	6x15	3690	1.67	22.03	5.79
⑤Aladag-P.brutia	785	N65W	10	30x50	217	45.58	37.02	23.47
⑥Aladag-Abies	1200	N60W	26	20x20	376	28	32.67	13.9
⑦Aladag-Abies/Cedrus	1530	S35E	21	20x30	1550	15.9	44.44	9.5

sea turtle. In this site *Pinus halepensis* was dominant tree species with undergrowth of coastal maquis plants such as *elica* species. Tree density was low but many succeeding trees of *P.halopensis* were requiting (Fig.2).

Cataran site was situated near Cukurova dam and also belongs to conservation area. This conservation area was small and surrounded by wheat field. Though standing biomass of dominat species of *Pinus brutia* was high, this forest had lack of small size trees of *P.bruita* (Fig.2) and there were some open spaces in this site which looked cause by human impact. On the other hand tree density of undergrowth for maquies was very high and *P.brutia* was hard to regenerate under the maquies. Dominant species of this forest will be replaced by broad leaved species like *Quercus* species in stead *of P.brutia.*

Karatepe-Mille Park site was in national park and has conserved these fifteen years from artificial disturbance. Dominant tree, *P.brutia* successively regenerated but number of recruited trees for the other species in small size exceeded that of *P.brutia* and there is some possibility of broad leaved species like *Quercus* or Arbutus species dominating or these species will codominate with *P.brutia* in future.

Karetepe-Maquis site was also in conservation area but local people selectively cut trees for making hand craft. Tree density and tree height of maquis in this site were high and species diversity was high. Dominant species in this site were *Arbtus andrachne* and *Quercus occifera* ,and *Q.coccifera* will become dominat mixed with *A.abdrachne* in future estimated from Fig.2.

P.brutia forest in Aladag-P.brutia site might be man-made one with naturally regenerated young trees (Fig.2). Tree density was lower but average tree height was high. This site was the valley floor and site quality was high. Potential tree height of *P.brutia* estimated from relationships between diameter and tree height was the biggest in all sites.

Adalag-Abies and Adalag-Abies/Cedrus sites were more than 1000m in altitude and belong to sub-alpine zone (Altun 2000, Yilmaz 2001).

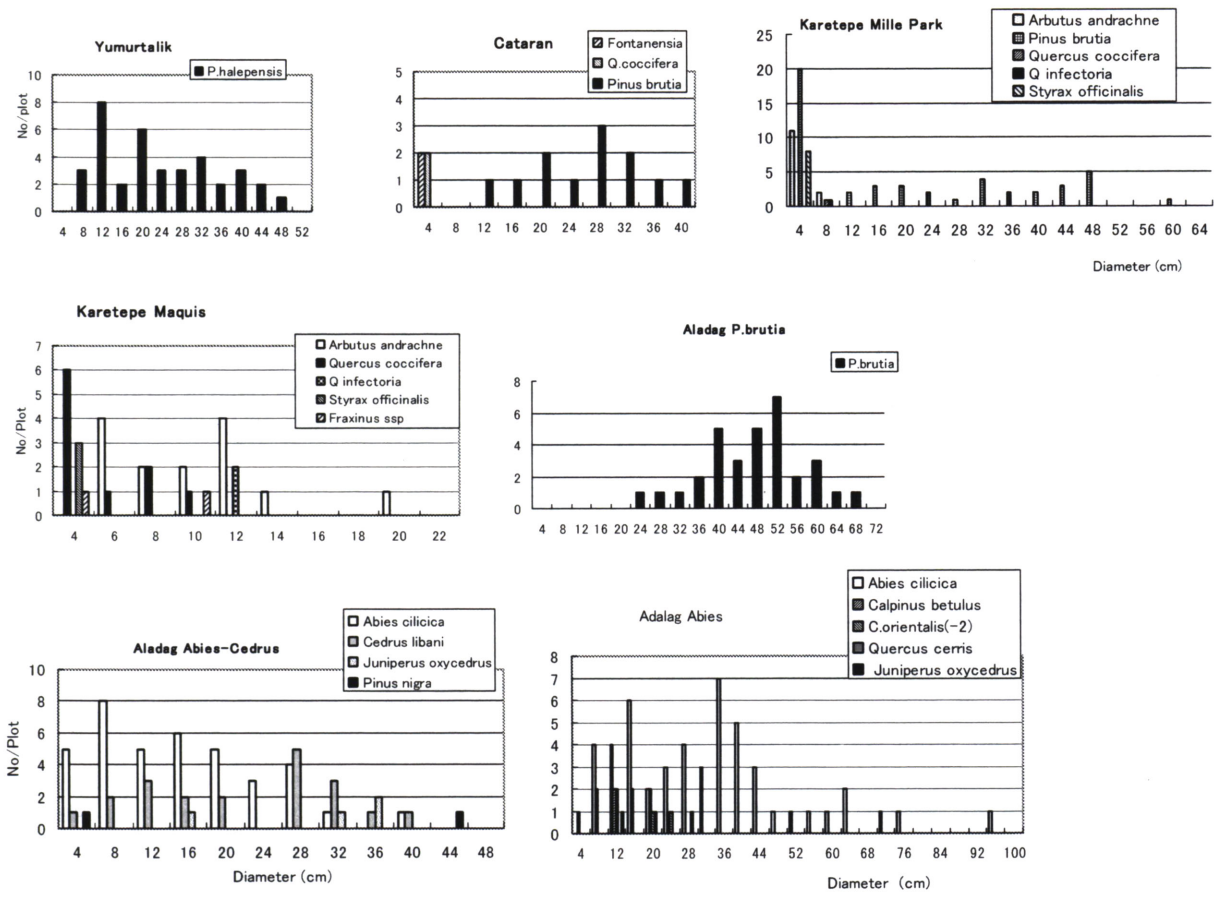

Fig.2 Tree diameter distribution in each plot.

In Aladag-Abies site *Abies cilicai* was dominant and successively regenerated though forest floor was rocky.

Aladag-Abies/Cedrus site was a felling prohibition forest of *Cedrus libani* and dominant species were *A.cilicia* and *C.libani*. Larger sized trees were mostly occupied by *C.libani* but number of regenerating young ones for *A.cilicia* was more than that of *C.libani*. *Cedrus* may be pioneer species and *Abies* species will dominant in this site instead of *Cedrus* in future.

4. Conclusion

Vegetation in Cukurova Plain was severely disturbed by human impact and it is very hard to estimate vegetation in the past. Even though in sub-alpine zone and some conservation areas, livestock invaded and grazed undergrowth and saplings of trees. But we may able to estimate origin vegetation from conservation area or national parks.

Soil property affects on vegetation composition and growth and there were many sites with sandstone and limestone. We should analyze relation between soil property and vegetation by soil and vegetation maps in Cukurova Plain after this.

Productivity of trees in Cukurova Plain estimated from analysis of annual rings was higher than we expected and which will be caused by longer time for photosynthesis of trees, and we should estimate biomass and productivity of sample stands in Cukuriva Plain.

References

Altun, T. Dogal Bitki Ortusu.Cukurova University Ziraat Fakultesi Genel Yayin No:235 Ders Kitaplari Yayin No:A-76, Adana.

Kira, T.1976 . Rikujo-Seitaikei-Gairon (Seitaigaku Kouza 5), Kyoritsu [in Japanese]

Yilmaz, K.T.Akdeniz Dogal Bitki Ortusu. Cukurova University Ziraat Fakultesi Genel Yayin No:141 Ders Kitaplari Yayin No:B-13, Adana.