The Oak – Ecology, History, Management and Planning II

01-03 June 2010

Suleyman Demirel University
Isparta/TURKEY

ABSTRACTS

Hosted by
Suleyman Demirel University
Faculty of Forestry

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Mustafa AVCI
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Meeting in Isparta- Turkey
01–03 June 2010

CONFERENCE PROGRAMME

ABSTRACTS

Conference Venue

Faculty of Forestry
Suleyman Demirel University
ISPARTA

CONFERENCE PROGRAMME

THE OAK - ECOLOGY, HISTORY, MANAGEMENT AND PLANNING II	
TUESDAY - 1 JUNE	
	CONFERENCE HALL
08.15-09.00	**REGISTRATION**
09.00-09.20	**WELCOME SPEECH**
09.20-09.30	**INFORMATION FROM ORGANISATION COMMITTEE**
OPENING SESSION **Moderator: Asko T. LEHTİJARVİ**	
09.30-10.00	**THE ROLE OF OAK IN THE SOLUTION OF TURKEY´S PROBLEMS** Hayrettin KARACA **- TURKEY**
10.00-10.25	**ANCIENT OAKS IN EUROPE – WHERE ARE THEY AND WHY ARE THEY IMPORTANT?** Vikki BENGTSSON **- SWEDEN**
10.25-10.50	**COFFEE BREAK**
SESSION 1 **Moderator: Nicklas JANSSON**	
10.50-11.20	**THE HABITAT AREAS OF OAK TAXONS IN THE FORESTS OF TURKEY AND THE ECOLOGICAL NEEDS OF THIS SPECIES** M. Doğan KANTARCI **- TURKEY**
11.20-11.40	**DEADWOOD – LIVING FORESTS** Sedat KALEM **- TURKEY**
11.40-12.05	**THE INTERNATIONAL OAK SOCIETY** Béatrice CHASSE **- FRANCE**
12.05-12.25	**OAK SPECIES AND THEIR STATUS IN TURKEY** Nihal ÖZEL **- TURKEY**

12.25-12.45	**OAK REHABILITATION** Mustafa KILIÇ, Yakup KILIÇ **- TURKEY**
12.45-13.50	**LUNCH**
SESSION 2 **Moderator: Ahmet TOLUNAY**	
13.50-14.10	**CONVERSION OF COPPICE FORESTS OBTAINED FROM SHOOTS (COPPICE MANAGEMENT)** Mustafa KILIÇ, Uğur TÜFEKÇİOĞLU **- TURKEY**
14.10-14.30	**ECOLOGICAL PROPERTIES OF THE OAKS IN A DISTRICT FROM THE MEDITERRANEAN REGION, TURKEY** Kürşad ÖZKAN, M. Güvenç NEGİZ, Ahmet MERT, Özdemir ŞENTÜRK, Halil SÜEL, Serkan GÜLSOY, Yunus ESER **- TURKEY**
14.30-14.55	**WOOD AND BARK INHABITING FUNGI ON QUERCUS** Stellan SUNHEDE **- SWEDEN**
14.55-15.30	**FOREST TREE GENE CONSERVATION – TARGET AND ASSOCIATED SPECIES** Gösta ERIKSSON **- SWEDEN**
15.30-15.50	**COFFEE BREAK**
SESSION 3 **Moderator: Brian LEVEY**	
15.50-16.10	**COPPICE MANAGEMENT CLASSES IN TURKEY** Rüstem KIRIŞ, Kamil KILIÇ, Nihat KARAKAYA, Mehmet CEYLAN **- TURKEY**
16.10-16.40	**MULTIFUNCTION PURPOSE IN THE WORK WITH PROTECTION OF THE OAK HABITAT IN THE COUNTY OF ÖSTERGÖTLAND - SWEDEN** Kjell ANTONSSON**, SWEDEN**

16.40-17.10	**A COMPARISON OF THE DIVERSITY OF SAPROXYLIC BEETLES ON OAKS IN TURKEY, FRANCE, UK AND SWEDEN** Nicklas JANSSON, Mustafa AVCI, Mustafa COŞKUN, Oğuzhan SARIKAYA, Hervé BRUSTEL, Glenn DUBOIS, Imogen WILDE, Jeremy DAGLEY, Peter HAMMOND
17.10-17.25	**THE SITUATION FOR THE OAK FORESTS AND ITS BIODIVERSITY IN TURKEY AND SUGGESTIONS FOR FUTURE MANAGEMENT** Mustafa AVCI, Nicklas JANSSON, Mustafa COŞKUN, Oğuzhan SARIKAYA **- TURKEY**
17.25-18.30	**POSTER SESSION**
18.30-19.15	**PLANTING OF OAK SEEDLINGS (NEXT TO THE FACULTY OF FORESTRY)**
19.30-21.00	**WELCOME COCKTAIL**

WEDNESDAY - 2 JUNE	
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SESSION 4 **Moderator: Vikki BENGTSSON**	
08.45-09.00	**PHYLOGEOGRAPHY OF THE STAG BEETLE (*LUCANUS CERVUS*)** Arno THOMAES, Koen De GELAS & Gloria ANTONINI **- ITALY/BELGIUM**
09.00-09.15	**THE DIVERSITY OF LEAFHOPPERS AND PLANTHOPPERS (HEMIPTERA: AUCHENORRHYNCHA) ON *QUERCUS* IN EUROPE** M.R. WILSON **- UNITED KINGDOM**

09.15-09.30	**ICHNEUMONIDAE PARASITOIDS OF KASNAK OAK NATURAL PROTECTION AREA'S HARMFUL INSECTS** Ayşegül ÖZDAN, M. Faruk GÜRBÜZ, Hasan KIRTAY **- TURKEY**
09.30-09.50	**COFFEE BREAK**
SESSION 6 **Moderator: Béatrice CHASSE**	
09.50-10.05	**SAPROXYLIC INSECTS IN PASTURE WOODLANDS IN WALES** Brian LEVEY **- UNITED KINGDOM**
10.05-10.20	**BIRD SPECIES FOUND IN OAK STANDS (THE EXAMPLE OF ISTANBUL – BELGRAD FOREST)** Zeynel ARSLANGÜNDOĞDU, Erdem HIZAL **- TURKEY**
10.20-10.40	**WOODPECKER SPECIES LIVING IN ISTANBUL-BELGRAD FORESTS** Erdem HIZAL, Zeynel ARSLANGÜNDOĞDU **- TURKEY**
10.40-10.55	**BOTANICAL, ECOLOGICAL PROPERTIES AND HISTORICAL USAGE OF KASNAK OAK [*QUERCUS VULCANICA* (BOISS. AND HELDR.)],: AN ENDEMIC SPECIES FOR TURKEY** Bilgin GÜLLER, Yasin KARATEPE, Hüseyin FAKİR **- TURKEY**
11.00-19.00	**FIELD TRIP TO KASNAK OAK FOREST**
20.00-23.00	**DINNER AT EĞİRDİR**

WEDNESDAY - 2 JUNE
CEDAR HALL
SESSION 5 **Moderator: Nihal ÖZEL**
SOME MORPHOLOGICAL AND PHYSIOLOGICAL SEED CHARACTERISTICS OF *QUERCUS CERRIS* L. AND *QUERCUS COCCIFERA* L. FROM PROVENANCE OF EĞİRDİR-YUKARI GÖKDERE Dilek YILDIZ, Ayşe DELİGÖZ Musa GENÇ **– TURKEY**
SHAPE ANALYSIS OF OAK LEAVES M. Tekin BABAÇ, Yasin BAKIŞ, Emel USLU **– TURKEY**
ANALYSIS OF MORPHOLOGICAL CHARACTERS OF OAK ACORNS Yasin BAKIŞ, M. Tekin BABAÇ **– TURKEY**
COFFEE BREAK
SESSION 7 **Moderator: Nevzat GÜRLEVİK**
GENERAL SOIL PROPERTIES OF PURE OAK (*Quercus*) FORESTS ON NORTHERN STRANDJA – TURKEY Ender MAKİNECİ, Ersel YILMAZ, Emrah ÖZDEMİR, Meriç KUMBAŞLI, Orhan SEVGİ, Akif KETEN, Vedat BEŞKARDEŞ, Hayati ZENGİN, Hatice ÇINAR YILMAZ Servet ÇALIŞKAN – **TURKEY**
EFFECT OF SULPHUR DIOXIDE (SO_2) GASES DURING COPPER MANUFACTURING IN MURGUL ON SOME MECHANICAL PROPERTIES OF OAK (*QUERCUS PETRAEA*) WOOD Elif TOPALOĞLU, Nurgül AY **– TURKEY**
DETERMINATION ON SOME MORPHOLOGICAL CHARACTERISTICS OF DIFFERENT TWO OAK SEEDLINGS (*Q. ITHABURENSIS* DECNE. SUBSP. MACROLEPIS (KOTSCHY.) HEDGE & YALT AND *Q. SUBER* L.) Serap BİLGİN, Esra ALIM - **TURKEY**

SITE PROPERTIES OF VALONIA OAK (*QUERCUS ITHABURENSIS* DECNE. SUBSP. MACROLEPIS (KOTSCHY) HEDGE & YALT.) COMMUNITIES IN AEGEAN REGION Nihal ÖZEL, Muhammet KILCI, Gıyasettin AKBİN, M. Emin AKKAŞ, H. Handan ÖNER, Nuran ALTUN - **TURKEY**
FIELD TRIP TO KASNAK OAK FOREST
DINNER AT EĞİRDİR

THIRSDAY - 3 JUNE	
	CONFERENCE HALL
08.50-09.00	**INFORMATION FROM ORGANISATION COMMITTEE**
SESSION 8 **Moderator: Gösta ERIKSSON**	
09.00-09.20	**DISTRIBUTIONS OF SPECIES RICHNESS OF TURKISH *QUERCUS*** E. USLU, M. T. BABAÇ, Y. BAKIŞ **- TURKEY**
09.20-09.40	**OUTLINES OF THE PHYTOGEOGRAPHY OF THE MEDITERRANEAN OAKS** Francesco SPADA **- ITALY**
09.40-10.00	**OAK DECLINE IN EAST GERMANY – SYMPTOMS AND BACKGROUNDS** KATZEL Ralf, LÖFFLER Sonja, HIELSCHER Kati, STRONBACH Björn, HEISTERBERG Betina, HEYDECK Paul, HORNSCHUCH Falko **- GERMANY**

10.00-10.20	**DECISION SUPPORT SYSTEM ON OAK (*Quercus*) BIOMASS ESTIMATION** Emrah ÖZDEMİR, Ersel YILMAZ, Ender MAKİNECİ, Meriç KUMBAŞLI, Orhan SEVGİ, Akif KETEN, Vedat BEŞKARDEŞ, Hayati ZENGİN, Hatice ÇINAR YILMAZ, Servet ÇALIŞKAN - **TURKEY**
10.20-10.50	**COFFEE BREAK**
SESSION 9 Moderator: Kjell ANTONSSON	
10.50-11.20	**WHY IS IT IMPORTANT FOR FUTURE MANAGEMENT TO MONITOR THE MORTALITY RATES OF OUR ANCIENT OAKS?** Ola BENGTSSON, Vikki BENGTSSON **- SWEDEN**
11.20-11.50	**MANAGING OAKS IN THE NATURE RESERVE "BOSCO DELLA FONTANA" (NORTHERN ITALY) AND NATIONAL GUIDELINES FOR MONITORING OAK-ASSOCIATED SAPROXYLIC BEETLES** Alessandro CAMPANARO, Franco MASON - **ITALY**
11.50-12.15	**PROMOTING THE CONSERVATION OFANCIENT OAKS (*Quercus robur*) IN EPPING FOREST -** UK Jeremy DAGLEY **- UNITED KINGDOM**
12.15-12.35	**KERMES OAK (*QUERCUS COCCIFERA* L.): AN IMPORTANT TREE SPECIES FROM AN ECOLOGICAL PERSPECTIVE** Yasin KARATEPE, Nevzat GÜRLEVİK **- TURKEY**
12.35-13.50	**LUNCH**
SESSION 10 Moderator: H. Tuğba DOĞMUŞ L.	

13.50-14.15	**500 YEARS OF OAK FOREST MANAGEMENT IN MEERDAAL FOREST (FLANDERS, BELGIUM)** Kris VANDEKERKHOVE, Hans BAETE, Beatrijs Van der Aa **- BELGIUM**
14.15-14.40	**SOUTOK – HOW TO SAVE OAK DOMINATED FLOODPLAIN FOREST** Antonin KRASA, **CZECH REPUBLIC**
14.40-15.05	**ECOLOGY AND MANAGEMENT OF MIXED OAK FORESTS OF *QUERCUS SUBER* AND *Q. CANARIENSIS* IN SOUTH SPAIN** MARANON, T., URBIETA, I. R., PEREZ-RAMOS I. M, IBANEZ B.,ZAVALA, M. A **- SPAIN**
15.05-15.25	**THE WOOD-PASTURES FROM SAXON TRANSYLVANIA, ROMANIA: KNOWLEDGE, CONSERVATION STATUS AND TRENDS** Kinga ÖLLERER, Tibor HARTEL, Cosmin Ioan MOGA, Ciprian SAMOILĂ **- ROMANIA**
15.25-16.00	**COFFEE BREAK**
SESSION 11 Moderator: Francesco SPADA	
16.00-16.20	**THREATS TO OAK DOMINATED STANDS IN BELGRADE FOREST, ISTANBUL (In case of deer breeding area)** Aytekin ERTAŞ **- TURKEY**
16.20-16.40	**ECOLOGICAL CONDITIONS OF DYER'S OAK (*QUERCUS INFECTORIA* OLIVIER SUBSP. *BOISSIERI* (REUTER) O. SCHWARZ) DISTRIBUTION AREA IN WEST ANATOLIA** Nihal ÖZEL**,** Dr. H. Handan ÖNER, Gıyasettin AKBİN, M. Emin AKKAŞ, Muhammet KILCI, Nuran ALTUN **- TURKEY**

16.40-17.00	**SPATIAL ANALYSIS OF OAK FORESTS IN ISPARTA REGIONAL FOREST DIRECTORATE WITH GEOGRAPHIC INFORMATION SYSTEM** H. Oğuz ÇOBAN, Mehmet EKER, Yasin KARATEPE **- TURKEY**
17.00-18.00	**POSTER SESSION**
18.00-19.30	**VISIT TO GÖLCÜK NATURE PARK AND ROSE GARDENS**
19.30-23.00	**BANQUET DINNER**

POSTERS

1. **THE EFFECT OF RADICLE PRUNING ON ROOT AND SHOOT MORPHOLOGY IN *QUERCUS VULCANICA* SEEDLINGS-** Ayşe Deligöz, Dilek Yıldız, Musa Genç – **TURKEY**
2. **GROWTH AND DEVELOPMENTS KINDS OF *QUERCUS* L. IN MARDAKAN ARBORETUM AND THEIR USE IN GARDENING** - Z.H.Abbasova, Z. E. Memmedova, A. P. Bagirli, A. Koksal, V.N.Haciyev – **AZERBAJIAN**
3. **SAMPLING *LUCANUS* SP. (SCOPOLI, 1763) OF THE WEST-PALAEARCTIC-** Arno Thomaes, Luca Bartolozzi, Michele Zilioli, Koen De Gelas & Gloria Antonini – **ITALY**
4. **MULTIPLE USAGE OF OAK FORESTS IN RUISSALO ISLAND IN SOUTH-WESTERN FINLAND-** Asko Lehtijärvi –**TURKEY**
5. **THE CAPACITY OF CARBON SINKS IN THE SOILS OF DEHESAS CONTAINING *Quercus ilex* L. ssp. *ballota* (Desf.) Samp-** Díaz Jaimes, LA.,Parras Alcántara, L., Fernández, Rebollo P. y Carbonero, MD –**SPAIN**
6. **SOME NEW MONUMENTAL OAK TREE RECORDS FROM BOLU-** E. Uslu, N. Aksoy, B. Torğut And M. T. Babaç – **TURKEY**
7. **USAGE OF OAK SPECIES IN LANDSCAPE DESIGN** - Faik ŞAVKLI – **TURKEY**
8. **SPECTRUM VARIABILITY OF HOLM OAK LEAF IN DEHESA. INFLUENCE OF EDAPHIC FACTORS AND LAND USE -** García AM, Pérez-Marín D, Carbonero MD, Serrano M, Moreno F, Leal JR, Fernández-Rebollo P. - **SPAIN**
9. **FUNGAL SPECIES ON OAK IN TURKEY -** H.Tuğba Doğmuş Lehtijarvi, Asko T. Lehtijarvi, Ayşe Gülden Aday, Funda Oskay- **TURKEY**
10. **INFLUENCE OF SHEEP GRAZING PRESSURE ON PHYSICAL SOIL VARIABLES IN AREAS REFORESTED WITH *QUERCUS* SPP.**

PRELIMINARY RESULTS - MORENO ELCURE F , CARBONERO MUÑOZ MD, Leal Murillo JR, Fernández Rebollo P – **SPAIN**

11. **EFFECTS OF A SHORT DURATION REST IN GRAZING ON THE SOIL OF *QUERCUS ILEX* SUBSP. *BALLOTA* PASTURES-** Moreno Elcure F , Carbonero Muñoz MD, García Moreno A, Leal Murillo JR, Fernández Rebollo P - **SPAIN**.

12. **SOME ACORN AND SEEDLING CHARACTERS OF *QUERCUS PONTICA* C. Koch. A RARE PLANT IN TURKEY -** Sezgin Ayan, Nurcan Yiğit, Hakan Şevik **– TURKEY**

13. **CORK OAK DISEASES AT DOÑANA NATIONAL PARK (SW SPAIN) -** P. De Vita, P. Callier, M.S. Serrano, C. Ramo, L.V. García, C. Aponte, A. Trapero And M.E. Sánchez **– SPAIN**

14. **ELATERIDAE (COLEOPTERA) FAUNA OF OAK BIOTOPES OF IDA MOUNTAIN, WESTERN TURKEY** - Sakin Vural Varlı, Tuba Öncül Abacıgil, Serdar Tezcan, Nilay Gülperçin – **TURKEY**

15. **OAK DISEASES IN SOUTHERN SPAIN** - Serrano MS, Fernández-Rebollo P, De Vita P, Callier P, Trapero A, Sánchez ME – **SPAIN**

16. **NOMADIC PEOPLE OF OAK FORESTS IN TURKEY: YORUKS -** Sibel Nihal Başkalkan – **TURKEY**

17. **DECLINE OF RELICT CENTENNIAL CORK OAKS IN DOÑANA (SW SPAIN) AND POTENTIAL DELETERIOUS EFFECT OF TREE-NESTING COLONIAL WATERBIRDS -** Cristina Ramo, Teodoro Marañón, Cristina Aponte, María T. Dominguez, Paolo de Vita, Adela Moreno, Lorena Gomez-Aparicio, Pilar Burgos, Pierre Callier, María E. Sánchez and Luis V. García – **SPAIN**

18. **MINOR AND RARE OAK SPECIES IN THE CZECH REPUBLIC -** Václav Buriánek, Marie Benedíková - **CZECH REPUBLIC**

19. **CYNIPID GALLS (HYMENOPTERA: CYNIPIDAE) ON *QUERCUS VULCANICA* IN SULTAN AND TURKMEN MOUNTAINS** - Yusuf Katılmış And Suat Kıyak – **TURKEY**

20. **MICROMORPHOLOGICAL CHARACTERIZATION OF SOME TURKISH OAK (*QUERCUS* L.) TAXA BY SCANNING ELECTRON MICROSCOPE -** Caner Aktaş , Nurcan Demircioğlu, Hayri Duman and Zeki Kaya – **TURKEY**

21. **NEW BEETLE SPECIES FOUND ON OLD OAKS IN SOUTHERN TURKEY** - Nicklas Jansson, Mustafa Avcı, Mustafa Coşkun, Oğuzhan Sarıkaya - **SWEDEN/TURKEY**

22. **THE BEETLE FAUNA ON OLD OAKS IN KASNAK FOREST, ISPARTA, TURKEY -** Mustafa Avcı, Nicklas Jansson, Oğuzhan Sarıkaya, Mustafa Coşkun - **SWEDEN/TURKEY**

23. **WHAT CHARACTERISTICS OF OAKS ARE IMPORTANT FOR FORAGING MIDDLE SPOTTED WOODPECKER IN COPPICE LANDSCAPES IN SOUTHERN TURKEY?** - Anton Sunnergren, Nicklas Jansson, Per Milberg, Cahit Erdem –**SWEDEN/TURKEY**

24. **RICH AND UNIQUE BEETLE FAUNA FOUND ON POLLARDED (COPPICE) OAKS IN SOUTHERN TURKEY** - Mustafa Coşkun, Nicklas Jansson, Mustafa Avcı, Oğuzhan Sarıkaya - **SWEDEN/TURKEY**

25. **HOW SIMILAR IS THE SAPROXYLIC BEETLE FAUNA ON OLD LIVING OAKS AND DEAD LAYING OAK LOGS IN SWEDEN? -** Kerem Sancak, Nicklas Jansson – **SWEDEN**

26. **THE BEETLE FAUNA ON OLD OAKS IN A CEMETARY IN ADANA REGION, SOUTH TURKEY -** Tolga Gürkan, Erol Atay, Nicklas Jansson – **TURKEY/SWEDEN**

27. **THE RANGE OF BOZ PIRNAL OAK (*QERCUS AUCHERI* JAUB. & SPACH.) IN TURKEY AND IT'S USING IN SILVOPASTORAL SYSTEMS –** Mesut Bilim, Gizem Üçok - **TURKEY**

28. **ALLOMETRIC EQUATIONS FOR ESTIMATING THE BIOMASS OF THE MOST ABUNDANT WOODY SPECIES IN A FOREST OF *QUERCUS ILEX* L. PRADES (CATALONIA, SPAIN) -** Lledó, M. J. - Boronat, J. **- SPAIN**

29. **VARIATION IN THE AMOUNT OF LITTERFALL IN TWO *Q. ILEX* L. STANDS GROWING UNDER DIFFERENT CLIMATE -** Lledó, M.J., Sánchez, J.R., Terrones, B. – **SPAIN**

30. **OLD OAK FORESTS AS KEY HABITAT FOR ENDANGERED WOODPECKERS -** Gilberto Pasinelli - **SWITZERLAND**

ABSTRACTS

ORAL PRESENTATIONS

ANCIENT OAKS IN EUROPE – WHERE ARE THEY AND WHY ARE THEY IMPORTANT?

Vikki Bengtsson, Ancient Tree Forum, Träringen 66, 416 79 Göteborg, Sweden
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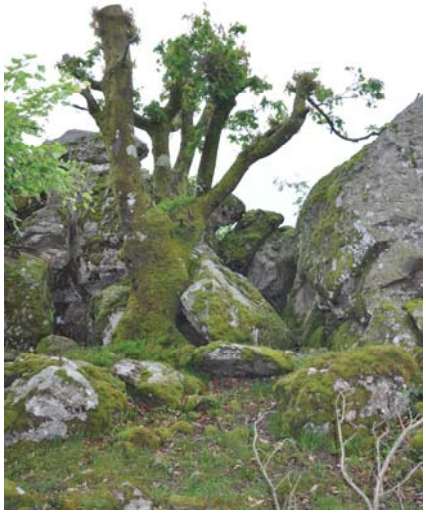
Windsor Great Park, England. Ted Green, founder of the Ancient Tree Forum describing the importance of ancient trees oaks to a group from Sweden

Ancient trees are unique! They have provided a stable habitat and contain a huge range of niches developed over hundreds of years. They are now a rare feature of the European landscape and thus the huge range of organisms, many of which are specialised, are also rare. No-one really knows how old an oak tree can become, but we do know that even with all the modern technology, an ancient oak tree is impossible to recreate apart from by waiting 400 years! Individuals known from Sweden and England may be as much as 1000 years old (Alexander *et al*, 1998, Read, 2000, Green, 2001).

Ancient pollarded oak, cut for charcoal in Spain



Surprising as it may sound – it is the habitat created by fungi which decay the wood which is what helps to make the old trees so important for wildlife diversity. Decay is not a static condition and as the habitat changes especially as trunks and branches hollow and the bark ages, new habitats are created and exploited by increasingly specialised species. Hollowing is thus considered to be a natural process of ageing (Green, 1993, Rayner, 1996).

As well as being of interest for biodiversity our ancient oaks often tell a story of past land use or have a cultural connection. They may be "working trees" such as pollards, shreds, cork oaks or coppice or they may be open grown showing a connection with a pastoral landscape.

The data regarding where our ancient oaks are is patchy and where they occur is often closely linked with land use history. In very general terms there are often fewer ancient trees where the soils are good for agriculture and more where soils are poor such as in mountainous regions. There are some key "hot spots" for ancient trees but also large areas with virtually none.

An individual tree protected in Sweden

In Sweden there is a national Action Plan for ancient trees and there is a protection mechanism in place for individual ancient trees. In Belgium, Germany and Poland there are national registers and some individual trees are protected. Few large sites remain in the parts of Europe occupied during the First and Second World Wars. Some countries have a Natura 2000 habitat type which includes ancient trees, but this is not applicable in all EU countries. Subsidies are also available in some countries to manage ancient trees. In southern France

and Spain there are wood pastures of great significance, some of which are still in active management, with grazing and pollarding still taking place. The awareness of the value of ancient trees across Europe is developing but there is still a long way to go.

An ancient oak in the Czech Republic which had died and was reconstructed in an exhibition to explain their value

Ancient oaks are a vulnerable resource where ever they occur; it takes only a couple of hours to cut them down and hundreds of years to replace them. When they disappear so does the rare wildlife associated with them. It is vital that we make sure their habitat is recognised and valued and replaced by the establishment of new trees to become the ancients of the distant future. We all have a responsibility to protect and conserve the ancient trees we have left and learn from one another.

One of the historic “hedgerows” of pollard oaks that has recently been recognised as of national significance in Belgium. (Photo Jill Butler)

Alexander, K.N.A., Green, E.E. & Key, R.S. (1998) Managing our Ancient Trees. Tree News, The Tree Council

Green, E. E. (1993). Introducing new theories on wood rotting fungi. Mycologist, 11(2):80-84.

Green, E. E. (2001). Should ancient trees be designated as Sites of Special Scientific Interest? British Wildlife. 12 (3).

Mattheck, C. & Breloer, H. (1995). The Body Language of Trees. Research for Amenity Trees. No.4, HMSO. London.

Rayner, A.D.M. (1996). The Tree as a Fungal Community in Read, H. Ed (1996). Pollard and Veteran Tree Management II. Corporation of London.

Read, H. (2000) Veteran trees: A guide to good management. English Nature.

The Oak – Ecology, History, Management and Planning II
01-03 June 2010, Suleyman Demirel University, Isparta/TURKEY

THE HABITAT AREAS OF OAK TAXONS IN THE FORESTS OF TURKEY AND THE ECOLOGICAL NEEDS OF THIS SPECIES

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Oak species form the most common type of tree in the forests of Turkey. Different oak species constitute forests in a variety of ecological environments from barren moorlands to mountainous terrains under the effect of mild and humid climate of Mediterranean and cool and moist climate of Black Sea.

5000 year old human settlement in Anatolia and Thrace regions has a considerably negative impact on the forest lands. Along with this fact, oak forests especially of the most arid areas were much more destroyed ones due to the excessive cutting and grazing. As a consequence of stools and stem shoots, oak species survived in vast areas where the climate conditions were appropriate. The effect of climate change regarding a period of 5000 years should be taken into consideration in the course of the studies to be conducted on the spreading areas of oak forests in Anatolia. The eruptions of Asama (Japan) and Laki (Iceland) volcanoes in 1873, Cracatoa volcano in 1883, Pelee (Martinik) and Santa Maria (Guatemala) volcanoes in 1902, all resulted in drought and cold winters in Anatolia too. Similar effects were also observed concerning the dust particles and gas released into the stratosphere following the eruptions of El Chichón (Mexico), Nevado Del Ruiz (Colombia) in 1982 and Pinatubo (Philippines) in 1991. As a consequence, it resulted in significant amounts of destruction over the oak forests both for the need for wood burning in cold winters and grazing of cattle. Availability of lignite and anthracite coal deposits and their common usage in Turkey, and the increasing use of natural gas and other ones have decreased the amount of such damage on oak forests. The oak forests which have been operated as coppice forests or moors have started to be turned into the coppice shoots as a result of the increasing attempts accompanying the first one started in Demirköy in 1960s.

In Turkey, it is possible to note 49 oak taxons in total, comprised of 31 oak species and their subtypes and varieties. The present number of oak taxons is understood to be higher, yet some taxons being grouped in recent studies by statisticians reveal a lower one. The oak species in Turkey could be grouped as white oak, red oak, green (unseasoned) oak (holm oak), and other and foreign oaks.

Extensive studies are required to be carried out about the habitat areas of oaks in Turkey with respect to the climate, geographical feature, bedrock/soil characteristics, light and nutrient requirements, other tree and bush types surrounding them, and similar aspects. The attempts to turn oak coppice forests into the woods will enable the studies to be more comprehensive by means of which favorable habitat conditions for oaks will be

examined in detail. These habitat conditions of oaks should be known in order to choose the right species for the plantation areas besides for the studies to be conducted to renew the wood shoots grown out of coppice forests with seeds. This paper will present a short summary of the data on the favorable habitat conditions of oak trees.

Key Words: Oak forests, oak species, ecology, habitat.

DEADWOOD – LIVING FORESTS

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According to a report by WWF, the global conservation organization, lack of veteran trees and deadwood in forests is a major cause of biodiversity loss. The report, *Deadwood – Living Forests,* reveals that a third of forest-dwelling species rely on dead or dying trees, logs, and branches for their survival. The removal of decaying timber and old trees from forests lead to a decline in species such as insects, beetles, fungi, and lichens. Woodpeckers, bats, and squirrels which nest in hollow trees also loose their natural habitats.

The amount of deadwood is at a critically low level in most of the forests today, mainly due to the lack of recognition of its importance, inappropriate management practices in commercial forests and even protected areas.

Whereas forests with dead and veteran trees are often much healthier and resistant to disease, pests, and climate change than young tidy forests. Deadwood keeps forests productive by providing organic matter and nutrients for trees, preventing soil erosion, and providing long-term storage for carbon, which mitigates some of the impacts of climate change.

Cleaning off the forest from decaying and dead trees has been a traditional practice in Turkey too. Conservation of biodiversity should be considered not only in protected areas, but also in managed forests as well. Therefore, in parallel with the growing trend in the world, intervention on forest ecosystem should be kept at minimum level and old trees should be allowed to die and decay in the forest, which would be the most environmentally appropriate approach.

However, implementing it on the ground depends on changing the traditional mentality/behavior and internalizing the environmentally-friendly approaches among those who have impact on forests by planning, managing and/or using them.

WWF-Turkey implemented a project in 2005-2006, aiming to contribute to the conservation of Turkey's forest biodiversity by increasing the awareness among forest planners/managers; young forestry students and schoolchildren on the role and importance of veteran and dead trees in forest ecosystems.

A set of publications (including a 16-page-booklet, a poster and a postcard) were published and distributed among the target groups, which were complemented by a series of seminars and communications activities.

WWF-Turkey also cooperated with relevant governmental organizations (e.g. General Directorate of Forestry, General Directorate of Nature Conservation and National Parks, etc), environmental NGOs, scientists, selected forestry faculties and schools.

THE INTERNATIONAL OAK SOCIETY

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History

Created 25 years ago by a small group of people in several different countries for the purposes of exchanging acorns, today the International Oak Society (IOS) has nearly 500 members across the world in nearly 30 countries. Although collecting and exchanging acorns remains an important activity uniting members and promoting exploration and discovery, the IOS has since grown and developed many activities that more broadly support its initial goals which include advancing the state of scientific knowledge regarding oaks and oakland ecology and providing information regarding their culture, conservation and management.

A diversified membership for a wide range of interests

The International Oak Society membership is made up of individuals from many different spheres. The presentations at the Triennial conferences reflect this diversity and are very varied in subject matter. Some examples from the past include, *Observations on the entomofauna of west palearctic oak* by P.F. Whitehead ; *Oaks in British and Irish folklore* by A. R. Vickery ; *Oaks in botanical literature* by Brent Elliott ; *The value of a scientifically aesthetic oak collection* at the Scott Arboretum by Andrew Bunting ; *Historical information and the state of oak collections in France* by Thierry Lamant ; and, *Oaks in environmental education* by Carol Baird.

The IOS triennial conferences – held since 1994 in prestigious institutions such as the Morton Arboretum (USA; 1994) or King Alfred College (England; 2003) – bring together researchers of many disciplines, well illustrated by the topics presented at the most recent Triennial Conference in Puebla, Mexico hosted by the Benemérita Universidad Autonoma (Mexico; 2009). *Who am I this time? The affinities and misbehaviors of* Quercus ellipsoidalis *E. J. Hill* by Andrew Hipp, Jaime Weber and Alka Srivastava from The Morton Arboretum ; *Inventory, Use, and Distribution of Genus* Quercus *in La Estacada, Mexico* by Natividad D. Herrera Castro, Arturo Hernández Abarca, Elvia Barrera Catalán, Maricela Rodríguez-Acosta ; *The Conservation and Population Increase of the Endangered Species*, Quercus sichourensis by Chen Wen-yun from the Kunming Institute of Botany, Chinese Academy of Science – to name but a few.

Future Triennial conferences

The next triennial conference is in 2012 and it will be in France, hosted by M. Antoine Kremer, who is Research Director at INRA (Institut National de la Recherche

Agronomique) and winner of the Wallenberg prize in 2006 for the extraordinary research he has coordinated concerning how oaks repopulated Europe after the last glacial periods.

Our target for 2015 is China. The great oak diversity, enigmas and surprises represented in the Chinese flora are obviously sufficient reasons for the IOS to be interested in going there. But also – as with Mexico - it is particularly appropriate that our Society provide a platform for Chinese researchers to present their work and make known their opinions about conservation policies and the ecological status of their natural resources. It is extremely important that the IOS contribute to increasing collaboration with those countries where botanising and seed collecting are not always very easy things to do.

Conservation efforts

Increasingly the IOS is devoting part of its resources to funding oak conservation projects around the world. *Q. sichourensis*. is a good example of this.

This species, which is endemic to China and was first described in 1951, is considered to be criticially endangered since the publication of the *Red List of Oaks* by Oldfield and Eastwood.

Only five individuals in three different locations are known today. Locating additional wild populations in southeast Yunnan and west Guizhou, researching the physiology and ecology of seeds and seedlings, and establishing seedlings in different Chinese botanic gardens are all part of intensive efforts coordinated by Dr. Zhou Zhe-kun at the Kunming Institute of Botany in southern Yunnan.

In collaboration with the National Natural Science Foundation of China, the International Oak Society awarded a research grant for this project and organised a very successful fund-raising campaign to collect additional funds to help save *Q. sichourensis*. The funds contributed by the IOS have gone towards reintroducing seedlings back into the wild and for the field work needed to evaluate precisely the status of the wild populations in order to determine locations for reintroduction.

Honouring outstanding achievements

One of the goals of the International Oak Society is to honour outstanding achievements of individuals in different areas related to oaks. For example, in 2006 Nihat Gökiyğit and Hayrettin Karaca – both long-standing members of the IOS from Turkey – received a *Lifetime Service Award* for their on-going commitment to conservation in Turkey including the creation of TEMA which plays an important role in Turkish environmental protection and the planting of millions of oak seedlings in eroded Anatolian landscapes. Mr. Gökiyğit gave a short presentation of this project at the 5th International Oak Conference in 2000 in Asheville, North Carolina.

International Oak Society goals

- Advancing the state of scientific knowledge regarding oaks and oakland ecology
- Locating, preserving and recording significant oak-related literature
- Facilitating the location and distribution of living material for propagation of oaks
- Fostering communication among members via a journal, mailings, periodic meetings and website
- Promoting the study and naming of superior cultivars
- Sponsoring the preservation of oak-related traditions, art and lore
- Serving as registrar authority for oak cultivars, historic and champion trees, ancient groves and unusual or rare specimens
- Providing information regarding the use, preservation and appreciation of oaks and successful techniques for oak culture and management
- And honouring outstanding achievements by individuals in advancing these goals

Membership benefits include:

- Receiving Oak News & Notes, our newsletter which is published twice a year
- Receiving International Oaks, the official journal of the IOS published once a year.
- Being able to Access the « members only » parts of our website
- Participation in Oak Open Days/Events
- Participation in Triennial Conferences

And the most importnat benefit by far is that you will become a part of and help to enrich an international network of oak enthusiasts!

Photo captions :

1. *Quercus urbanii* Trel.
2. *Quercus repanda* Bonpl.
3. *Quercus grisea* Liebm.

The Oak – Ecology, History, Management and Planning II
01-03 June 2010, Suleyman Demirel University, Isparta/TURKEY

OAK SPECIES AND THEIR STATUS IN TURKEY

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Oak genus, which has about 400 species in the world, belongs to Fagaceae family and has 18 species in Türkiye. Taxonomical classification of Oak species in Türkiye is not clear as desirable as. There is a big variation in their morphological characters and hybridization with each other.

Three oak species *Quercus aucheri*, *Quercus vulcanica* and *Quercus macranthera* subsp. *syspirensis* are endemic in Türkiye.

Oak genus is very important in Türkiye economically. They have been used for many purposes, such as wood, fuel wood, nonwood products, grazing and etc.

There is not enough protection for oak species except one national park for *Quercus vulcanica* and some seed stands and gene conservation forests for different species.

In this study, taxonomical position, economical status and conservation status of oak species in Türkiye will be discussed and some suggestions will be made.

Key Words: *Quercus*, Oak, conservation of forests,

OAK REHABILITATION

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Our country's forest area is 21,2 million hectare. 10.5 million hectares of this area, ie 51% of this is unproductive forest area. 4.0 million hectares area that is 40% of the unproductive forest areas is covered with unproductive forest which has been obtained from shoots (coppice) with broad-leaved tree species mainly oak. There are also 2.3 million hectares of forests with %11-40 crown closure. 300 thousand hectares of %11-40 crown closure forests is unproductive oak high forest with %11-40 crown closure. As a result of preliminary studies, 3 million hectares of potential areas has been identified appropriate for technically working.

The proportion of population in the cities did not show a significant change in 1927 - 1950 periods, after 1950, the proportion of population in the cities has increased rapidly. In our country after 1985 an era has begun in which the population in the cities has been higher than the population in villages. After 1985s in our country, an observable decrease has been identified in the amount of hair goats, angora goats, domestic sheep and cattle in parallel with the reduction of the population in the villages. These developments have reduced the social pressures on our forests and on the other hand visible improvements in our forests are identified.

Our General Directorate, regarding these positive developments as opportunities, has begun rehabilitation works in the areas such as degraded forests, degraded coppice forests, un-forested forest land, agricultural area or untreated low covered forest (below %11-40 crown closure). The rehabilitation works started in 1998s have been accelerated by Afforestation and Erosion Control Mobilization Efforts Action Plan. 300 000 hectares have been planned for rehabilitation work during the plan period per year. Oak Forest Rehabilitation Action Plan was prepared by General Directorate of Forestry and between 2006 and 2015, a total of 1 million hectares of oak rehabilitation work was planned and started to be implemented.

CONVERSION OF COPPICE FORESTS OBTAINED FROM SHOOTS (COPPICE MANAGEMENT)

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It is known that Forests in terms of forest management are managed in two forest form, even-aged (compartmental system) and uneven-aged (selection forest, continuous forest) forests.On the other hand forests are divided into three groups in terms of management types, seedling crop, coppice and seedling coppice forests.High forest, come from seed or was grown, coppice forest consist stool shoot and root shoot, seedling coppice forests are formed by both seed and shoot.

Our country's forest area is 21,2 million hectare and 27% of this forest area is covered with coppice forest obtained from shoot which include broad-leaved tree species mainly oak. 1,6 million hectare of this 5,7 million hectare forests are productive coppice, 4,1 million hectare is degraded (unproductive) coppice. Under the name of the energy forest establishment, 630 thousand hectares unproductive coppice forests were converted to productive coppice by the end of 2004. Planning of productive coppice forests are made generally according to the village working section with determining annual cutting areas and allowable cut is given to these areas according to the management plans.

However, the expectations of society from forests have changed and today for multiple utilization (functions) from forests are aimed. To achieve this, the obligation of making a proper planning and forest management is required. In order to take advantage of multi-faceted functions of forests at the highest level, it is necessary that forest areas should be increased and existing forest should be operated regularly and continuously. Because the realization of the desired functions is only possible with re-establishment of high forests and operating them regularly.

In this context, coppice management is not suitable for the realization of forest's multi-functions and also over time can cause destruction and disappearance of these forests in the application areas. Therefore our forests obtained from shoot and managed as a coppice that have completed social and economic functions should be converted into high forests with conversion of coppice works in a period of time.

Coppices are established by the trees which have the ability to give shoot and these shoots make up the coppice are budding from stump and root buds. According to formation, these are called provantif or adventitious shoot.

In our country, when coppice is mentioned first of all the oak species comes to mind. Alder, hornbeam, willow, chestnut, eucalyptus and acacia are the most appropriate type to coppice management. In the appropriate sites, broad-leaved species have the feature of shoot such as the beech, linden, maple, elm, ash, aspen, hazel, birch and are usually acting as filler in our forests.

Coppice forests are very old management type and this utilization type has been caused by heavy and irregular interventions to broad leaved forests. Currently coppice

forest management exists because of the demand for fuel wood and charcoal. However today it is accepted by the society that these forests rapidly should be converted into high forests without taking into account the tree types starting with the forests where the social demand towards forest is decreasing and no local pressure. Because within the forest management types high forest management is the most appropriate management type comparing with coppice forest and seedling coppice and this management type provides many services which have ecologic and economic value aiming today and future of the society.

ECOLOGICAL PROPERTIES OF THE OAKS IN A DISTRICT FROM THE MEDITERRANEAN REGION, TURKEY

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Degraded forests cover a large area due to the fact that the forests have been subjected to overgrazing and individual selection for a long time in the transition zone of the Mediterranean region, Turkey. Also water deficit during the summer time prevent to get through to climax type from the phase of succession of forest ecosystems in a short period. Additionally the region ecosystems will probably be affected dramatically because of human induced climate change. For those reasons, Knowledge of ecological properties of plants are vital for maintenance of the region forests and mitigation of negative impacts on those ecosystems against the challenge of global warming. On the context of this, one of the primary taxa is the oaks from the studies concerning ecological properties of the species point of view because the oaks have very important functions in terms of durability, stability, biodiversity and dynamism of the forest ecosystems. The oaks are common in the Mediterranean region. Amount of the oaks, *Quercus coccifera* and *Quercus cerris* cover large areas in the region. Besides, *Quercus vulcanica*, an endemic species, has the widest distribution in the Yukarı Gökdere forest district of the region. This study attempts to delineate the relations between distribution of oak species and environmental factors in the Yukarı Gökdere forest district located in the transition zone of the Mediterranean region, Turkey.

Keywords: Mediterranean region, The Oaks, Kasnak Oak, Abiotic factors

WOOD AND BARK INHABITING FUNGI ON QUERCUS

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Oak trees are associated with a large number of organisms, especially fungi and insects. Wood decaying fungi, causing brown rot and different types of white rot, are key role organisms for the saproxylic (wood living) beetle fauna. Wood decomposing fungi, especially the brown rotting species, are the primary cause of hollow oaks. Old hollow oaks include a great variety of niches and show an exceptionally large biodiversity. Such trees are declining in North Europe and in most other European countries. Old oaks have now become very precious for rare and red-listed species of e.g. insects, lichens and wood inhabiting fungi.

Wood and bark inhabiting fungi on *Quercus robur* and *Q. petraea* in North Europe are being studied in an ongoing project. Mainly Aphyllophorales but also certain species of Agaricales, Tremellales and ascomycetes are treated. So far, 100.000 oaks in Denmark, Estonia, Finland, Latvia, Lithuania, Norway and Sweden have been investigated. The fungal flora on more than 400 individual oaks in fixed sample plots in Sweden has been followed for up to 38 years. Studies include substrate requirements, succession, population structures, spatial distribution of decay, yearly occurrence of sporocarps, and geographical distribution. New and rare species have been described and illustrated, e.g. the ascomycetes *Moristroma japonicum*, *M. quercinum* and *Obolarina dryophila*. Mycelia have been inoculated into fresh oaks. The purpose of inoculation is to investigate the possibility of transferring rare and endangered wood fungi and to introduce decay to create habitats for rare wood insects. Among species inoculated are the polypores *Fistulina hepatica*, *Hapalopilus croceus* and *Piptoporus quercinus*. Special attention has been paid to rare and

endangered fungi like *H. croceus* and *P. quercinus*, both of which are wholly dependent on old oaks. Both species may continue to produce fruit bodies for decades after the oaks have died, on standing as well as fallen trunks. It is therefore of great importance to preserve also dead host trees (Fig. 1). *H. croceus* (Fig. 2) is declining all over Europe. In Sweden, where many of the European sites are found, *H. croceus* is protected by law.

FOREST TREE GENE CONSERVATION – TARGET AND ASSOCIATED SPECIES

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The three cornerstones of gene conservation- objectives, genetic variation, and management of gene resource populations are briefly presented. *Safeguarding the potential for adaptation* is the prime objective of forest tree gene conservation. The present genetic constitution is the result of the complex interactions of the evolutionary factors in the past, such as natural selection, gene flow, mutations and genetic drift. Most traits of adaptive significance are polygenically inherited, which means that many genes participate in the regulation of such traits and each gene have a small effect on the trait. General facts about evolutionary factors are presented. It is import to include the existing genetic variation in the gene conservation population, which is advantageously split into approximately 20 subpopulations. Two to four of these subpopulations should be large covering 200-300 hectares to take care of the gene conservation of the associated species to the target species in gene conservation. The large subpopulations should cover a broad span of site conditions and age classes. Finally, it is stressed that gene conservation should be in tune with production.

COPPICE MANAGEMENT CLASSES IN TURKEY

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In the world and also in turkey, forests which are the most integral part of the renewable natural resources were degraded in terms of rapid industrialization, parallel to the population in crease. The Turkish Forests of which 50% is degraded and 27% is coppice constitute 27.2% (21.2 million hectares) of the country's land area.

The convert the degraded forests to the high forests, the establishment of energy forest was started in 1978s. Among the broadleaved species Oak, Beech, Hornbeam, Alder, Chestnut and Ash mainly formed the sprout forests, considering energy forestry in the country. But recently multi functional utilization is utmost concern in sustainable forest management.

In this study the distribution areas of Oak, the most pervasive tree species in Turkey, are given by 27 regional Forest Directorates. In addition the Oak, the areas of coppice forests dominated with Alder, Chestnut and Eucalyptus by the Regional Forests Directorates were estimated, based on forest inventory facts by the Department of Forest Management and Planning.

Keywords: Oak, energy forestry, multi functional utilization

MULTIFUNCTION PURPOSES IN THE WORK WITH PROTECTION OF OAK HABITATS IN THE COUNTY OF ÖSTERGÖTLAND, SWEDEN.

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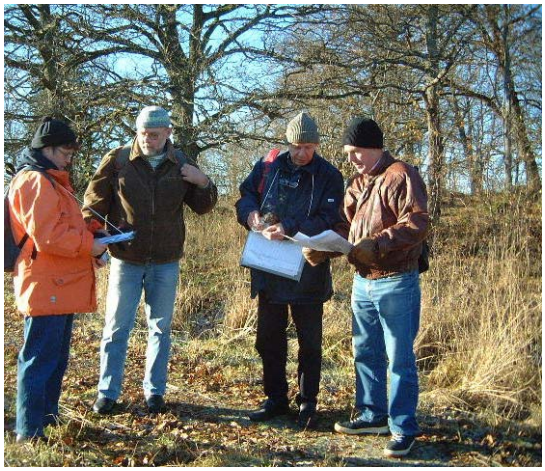
In Sweden the oak (*Quercus robur*) is the most species rich tree species. It is also the tree species with the most unique fauna. The species richness have found to be highest in the end of the life of an oak. Among all the around 1 000 species connected too oak there are very few that can bee regarded as pests and none of those can effect any conifers. There has been a large decline of oaks in Sweden from cuttings the last 200 years, but there are not so much cuttings today. A lack of grazing animals is the major threat to the oak habitats in Sweden today. In the oak district S of the city Linköping, SO Sweden, a work with mapping the oaks and its fauna and flora began in the beginning of 1990´s. A lot of old oaks was found, but in comparison with old mappings made by the Swedish kings, less than 5% is left. Strong correlations between the amount of old oaks (*Quercus robur*) and species richness and redlisted species have been found. As these areas have been found to be high ranked also in a European scale, a nature conservation work has started.



The mapping showed that the county of Östergötland have 33 500 old large oaks and 18 000 hectares of oak areas with high nature conservation values. Inventories made by different specialists have helped us to found the most important areas for different species. One special project worked with the Hermit beetle (*Osmoderma eremita*), found to be a good indicator of high species richness of other threatened species.

At national level it has also been an increased interest for old trees in general. One example is the “Action programme for old trees in the agricultural landscape”. In many districts, mapping of old trees are ongoing and special management plans for good oak areas are

produced. In some areas monitoring of the oak habitat has started.

As most of the oak areas in Sweden are owned by private landowners the work has too be made in collaboration with them. The main success factor in the discussions with the landowners is that we have chosen not to force them accept nature reserves, but work more together with planning, clearings, plantations and fencing. The aim is to have a good mixture, at landscape level, of different purposes for the areas like wood and bio-energy production, recreation, education and nature conservation. We try to make all of us proud of these important oak-areas by multifunction purposes and by information through media, brochures and guiding in situ.

A COMPARISON OF THE DIVERSITY OF SAPROXYLIC BEETLES ON OAKS (*Quercus* spp.) IN TURKEY, FRANCE, UK AND SWEDEN

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The saproxylic beetle fauna on old oaks (*Quercus* spp) are known to be very rich. This fauna is today threatened all over Europe and in neighbouring countries. The reason is lack of suitable trees from lack of right management or habitat conversion. In this project similar methods have or will be used in Israel, Turkey, Italy, France, UK, Czech Republic and Sweden. The aim with the study is to compare the diversity and similarity of this fauna in these countries. Preliminary results from the on going analysis are presented. Eight stands with old hollow oaks, spread on four areas, have been studied in Turkey during 2005-2009. The saproxylic beetles were caught with traps on 10 trees per stand in one season. In this preliminary presentation only 12 saproxylic beetle families were included (Scarabidae, Lucanidae, Elateridae, Tenebrionidae, Anobiidae, Mycetophagidae, Histeridae, Dermestidae, Cleridae, Erotylidae, Cholevidae, Scrtidae) and only data from France, UK and Sweden. A comparison shows that both the total species richness per stand and the medium number of species per tree was in most cases higher in Turkey than in the other countries (Figure 1).

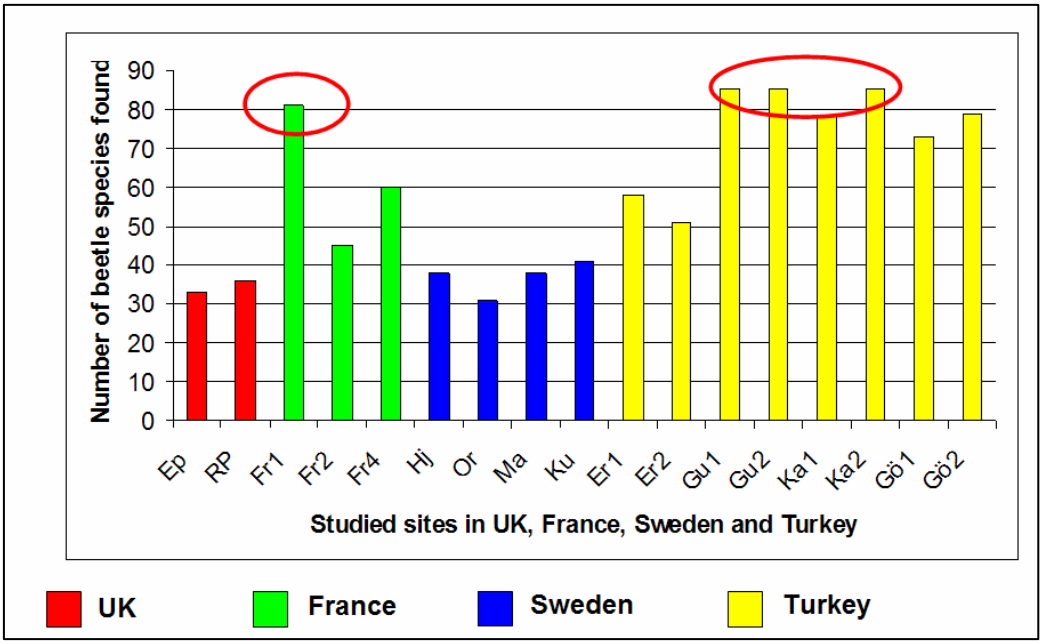

Figure 1. A comparison of number of saproxylic beetle species found on 10 studied hollow oaks per site in four countries.

Only 10 % of the species caught with window traps in Turkey and the countries from Western Europe were in common. Many of the beetle species found in Turkey were found for the first time in the country and so far 25 species were identified as new to science (Figure 2).

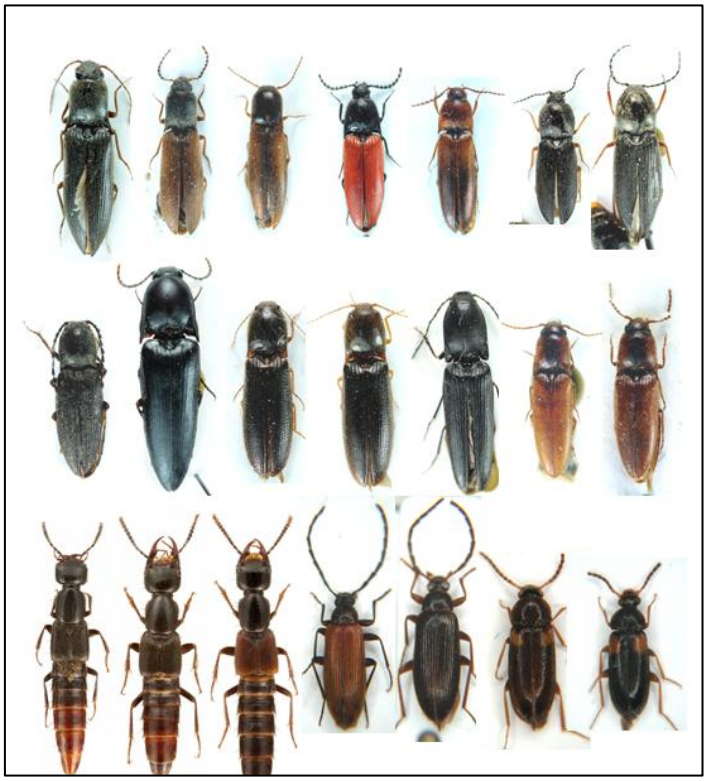

Figure 2. The new species found in studies of the saproxylic beetle fauna of old oaks in Turkey 2005-2009. *Agriotes* n sp2, *Agriotes* n sp3, *Ampedus* n sp, *Brachygonus* n sp, *Cardiophorus* n sp1, *Cardiophorus* n sp2, *Dicronyhus* n sp, *Elater* n sp, *Elathous* n sp 1, *Elathous* n sp 2, *Megathous* n sp, *Peripontius* n sp, *Tolphorea* n sp, *Hesperus auricomus*, *Hesperus gozukarai*, *Hesperus turcicus*, *Allecula* n sp1, *Allecula* n sp2, *Mycetochara* n sp1, *Mycetochara* n sp2.

Of the species found in Turkey, there are 10 species that are very rare and threatened in Europe and are on the European Red List. The most species rich trees in the study were pollarded oaks (trees with regularly cut branches) near Gülnar, Mersin region in Turkey (Figure 3).

Figure 3. The most species rich site in Turkey (near Gülnar in Mersin) with pollarded oaks. A unique place with 5000-10000 old oaks

THE SITUATION FOR THE OAK FORESTS IN TURKEY AND SUGGESTIONS FOR FUTURE MANAGEMENT

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Turkey has a large part of the land area covered by forest in comparison with many other countries (nearly 30%) in Europe. However a large part of the forest is heavily used by villagers and is not so productive in the sense of producing timber. But these trees are important because they produce large volumes of fire wood and fodder from coppicing or pollarding. The oaks (*Quercus* spp) in Turkey have the widest distribution area among the deciduous and cover approximately 6 million ha, but only 20% of this is productive high forests.

Oaks are most important as host trees for birds and insects when they get old. Results from our studies in southern Turkey show that for biodiversity of wood living beetles, it does not matter if the trees are free growing or if they are pollarded (high coppiced).

For keeping the high biodiversity of birds and insects in Turkish oak forests a multifunction approach would be of great value. A mixture of production of timber, bio-fuel, biodiversity, recreation, education and research at a national scale would be a good solution. For this reason a network of larger oak areas with the highest value and with different oak species represented, should be identified and protected in different parts of Turkey. The management plans for these areas should be produced by forest engineers together with biologist to get the best result.

PHYLOGEOGRAPHY OF THE STAG BEETLE (*LUCANUS CERVUS*)

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This phylogeography of the stag beetle *Lucanus cervus* (L., 1758) aims to elucidate the colonisation history and timing of this species from putative southern refugia after the last ice-age. The study will allow us to delineate evolutionary significant units, help to evaluate the current taxonomic status of the stag beetle and related species and detect hidden variation. The results will contribute to the conservation strategy. If the colonisation can be dated we plan to compare the colonisation of this dead wood depending species with data from its main food source, e.g. oaks (*Quercus* spp.).

We sequenced a fragment of approximately 750 basepairs at the 3' end of the Cytochrome Oxidase I gene (COI). In total we analysed 130 samples covering more than 50 localities distributed over its natural range. Our samples include the morphotypes *akbesianus*, *cervus, judaicus, pentaphyllus* and *turcicus*.

Our results show that most of Europe is occupied by closely related haplotypes differing for only one or two nucleotides. Recolonisation happened by two different haplotypes from a single refugium, Spain or Italy. The samples from Greece and Bulgary cluster together and are clearly differentiated form the other European haplotypes. This group shows a higher degree of diversity, indicative for large and stable populations but apparently this group was not the source for the recolonisation of Europe. The morphotypes *cervus* and *turcicus* from these countries are interspersed which suggests that these are not genetically differentiated. We did not find genetic support for a subspecies status of the morphotype *pentaphyllus*. More analyses are needed to draw conclusions for the morphotypes from the Middle East.

From a conservation point of view we conclude that most of the European range is genetically homogeneous and can be managed as such. Populations from Greece and Bulgary are a clearly separate management unit.

THE DIVERSITY OF LEAFHOPPERS AND PLANTHOPPERS (HEMIPTERA: AUCHENORRHYNCHA) ON *QUERCUS* IN EUROPE

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Leafhoppers and planthoppers are a group of sap-feeding phytophagous insects that may be abundant in many habitats, especially in grassland ecosystems. Distinct species associations are also found on many tree species. Over 40 species of leafhoppers and planthoppers are frequently associated with the two common *Quercus* in Western Europe: *Q. petraea* and *Q. robur*. This is the highest number found on European trees. The host plant associations of the *Quercus* leafhopper fauna will be presented. These associations range from species restricted to either *Q. petraea* or *Q. robur*, to those found on Quercus generally, to polyphagous species, which utilize *Quercus* among other Fagaceae. Other species may develop on various grasses but are found regularly within the canopy as adults. In Central Europe and Britain the highest diversity is found within the leafhoppers subfamily Typhlocybinae, which feed by piercing mesophyll cells and ingesting the cell contents. Some species within the genera Eurhadina, Alebra and Ribautiana are especially associated with *Quercus*. The majority of other leafhopper species feed from phloem tissue and genus Iassus has 4 European species associated with *Quercus*.

Most information on these species associations is known from Central Europe and Britain from *Q. petraea* and *Q. robur* and also the introduced Q. cerris. Much less information is known about other species associations on deciduous and evergreen *Quercus* in southern and Western Europe.

ICHNEUMONIDAE PARASITOIDS OF KASNAK OAK NATURAL PROTECTION AREA'S HARMFUL INSECTS

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This study was carried out to determine the parasitoid ichneumonid species which are biological control agent for *Quercus* in Kasnak Oak Forest Natural Protection Area in Isparta. Totally 63 species belonging to 11 subfamilies have been recorded in the research area. Among them, fifteen ichneumonids have been determined as biological control agents for *Quercus* harmful insects. Especially among these fifteen parasitoids, seven ichneumonids repressed *Archips xylosteana, Lymantria dispar, Tortrix viridana* which are harmful for Oak Quercus (*Quercus vulcanica*).

Keywods: Ichneumonidae, Biological control, *Quercus vulcanica*, Natural Protection Area

SAPROXYLIC INSECTS IN PASTURE WOODLANDS IN WALES

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In comparison to England the saproxylic fauna of parklands and pasture woodlands in Wales have been scarcely studied. 33 parkland sites in Wales have been identified as being potentially important for saproxylic invertebrates, because they contain numbers of mature and overmature oak trees and other deciduous trees.

In 1996 the saproxylic Coleoptera and Diptera of four of these parkland sites was investigated using a variety of trapping methods and hand collecting techniques by entomologists from the National Museum Wales and National Museums Liverpool. This survey showed that each of these four sites supported a rich fauna of saproxylic Coleoptera and Diptera.

The wetter and cooler climate of Wales means that many of the saproxylic species of Coleoptera found in southern England probably do not occur in Wales, but those saproxylic groups of Diptera better adapted to a wetter cooler climate are better represented.

Comparison of the results of the different trapping methods and hand collecting shows that a combination of different collecting methods will produce a more complete inventory of saproxylic species than reliance on a single method.

The results show that at each site a high number of saproxylic Coleoptera species were represented in the samples by only one or two specimens and that the use of replicates of the same trap type will increase the number of species captured significantly.

BIRD SPECIES FOUND IN OAK STANDS (THE EXAMPLE OF ISTANBUL – BELGRAD FOREST)

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Belgrad Forest, which is our research area, is located in the north of Istanbul, in the former forest belt, and covers an area of 5,441.71 hectares. Oak species (75%) constitute Belgrad Forest's dominant trees. Oaks show distribution in single, double, pure, mixed, loose or normal closeness in stands in the area. In this study, identification of bird species has taken place in 9 different oak stands (Mbc3, MC2, Md1/Dycb3, Md2/Dycb3, Md2/MDybc3, MD3, MDycd3, MGncb3, KnMcd3). Research was conducted between the years 2001-2003 using point count and transect methods at 66 observation points. 103 bird species from 32 families and 13 orders have been identified. From these species; 28 resident, 4 resident/ passage migrant, 2 resident/ winter migrant, 4 summer migrant, 18 summer/ passage migrant, 39 passage migrant, 4 passage/ winter migrant, 2 winter migrant and 2 vagrant. Of them 48 species nested in the study area. The highest number of species observed are; *Fringilla coelebs* L., 1758, *Parus major* L., 1758, *P. caeruleus* L., 1758, *Turdus merula* L., 1758, *Erithacus rubecula* (L., 1758) and *Garrulus glandarius* (L., 1758). In conclusion, most bird species were observed in Mbc3 stand, the most frequent and highest numbers of individual birds were observed in Md2/Dycb3 stand. According to Shannon-Wiener Diversity Index, biodiversity values are analyzed by type of stand; the highest value was found to be in Md1/Dycb3 stand.

WOODPECKER SPECIES LIVING IN ISTANBUL-BELGRAD FORESTS

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Belgrad Forests is located in Northwest of Istanbul province of Turkey. The Area is in European side of the city. The Belgrad Forests covers an area of 5.441,71 hectares. Belgrad Forests is a deciduous forest. The oak species (*Quercus* sp.) cover 75% of the forested area. The aim of this study was to determine the woodpecker distribution of Belgrad Forest in Istanbul, Turkey. The 5,441.71 hectares study area was divided into 100 systematic observation points. Point counts were conducted in the forest in February, March, and April between the years 2001-2004 and 2007-2010. As a result of the studies, 7 species from Picidae families of Piciformes order were recorded. *Picus canus* Gmelin,1788, *Picus viridis* Linnaeus, 1758, *Dendrocopos major* (Linnaeus, 1758), *Dendrocopos syriacus* (Hemprich and Ehrenberg, 1833), *Dendrocopos medius* (Linnaeus, 1758), *Dendrocopos leucotos* (Bechstein, 1803), and *Dendrocopos minor* (Linnaeus, 1758) species have been living in Belgrad Forests. *D. major* is the most common species and *D. leucotes* is the rarest species among them. Moreover in the 8 year study period, we found a remarkable decrese in the number of *P. viridis* species. Belonging to this species, distribution maps have been maked in this study.

BOTANICAL, ECOLOGICAL PROPERTIES AND HISTORICAL USAGE OF KASNAK OAK [*QUERCUS VULCANICA* (BOISS. AND HELDR.)],: AN ENDEMIC SPECIES FOR TURKEY

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Quercus is a genus in the family *Fagaceae* which show expansive native distribution all around Anatolia. The genus is composed of 18 species in Turkey. Three taxa are endemic species for Turkey (*Q. vulcanica* and *Q.macranthera* subsp*. syspirensis* and *Quercus petraea* subsp. *pinnatiloba*)

Kasnak oak [*Quercus vulcanica* (Boiss. and Heldr.)] is a member of the white oak section. This species naturally distributed from 1200-2000 m altitude in Kütahya-Türkmen mountain, Murat mountains, Kütahya-Gediz Şaphane mountains, Afyon-Dereyaka plateau, Konya Sultan mountain, Beyşehir–Erenkilit mountain, Isparta (Eğirdir, Şarkikaraağaç, Yenişarbademli), Kayseri-Ahır and Erciyes mountain, Antakya-Amanos mountain, Ilgaz mountain, Köroğlu mountains, Küre mountains. It is slow-growing and long-lived (up to 600 years), can reach height of 25-30 m, 1.6 m diameter and stand form only in favorable site in Isparta. In other distribution areas species found small groups and grows up to 10 m height (northern distribution areas) or bushes form (Köroğlu Mountain). Latitude and topography are important factors influencing the distribution of Kasnak oak within its range. Kasnak oak stands mainly and widely spread in Isparta region especially eastern slopes of Davras Mountain. It is associated with humid-mountain climate which has Mediterranean-continental climate transition features.

The species prefers lands far from northern cold winds. For this reason it can be seen trough the valleys sheltered from north winds and hillsides; and at the bottom of dolins that have deep soil in karstic areas.

On the eastern slopes of Davras mountain, where it exhibits widely distribution, Kasnak oaks found on bedrocks that was formed Jurassic - Cretaceous limestones. The species can also grow on andesitic lava, trachi-andesite, schists and sandy- clay reservoirs. Soil types change from loamy clay to sandy loam (pH 6.0-7.7). Lime content of the soils can be reach from 0 % up to 29 %.

Plant associates of Kasnak oak can change from one location to others. For example in the northern part of Turkey (Küre, Köroğlu and Ilgaz mountains) associate species are; *Pinus sylvestris, Pinus nigra, Abies bornmuelleriana, Quercus frainetto, Quercus infectoria, Quercus macranthera subsp syspirensis, Quercus hartwissiana, Quercus pubescens, Quercus petraea, Acer campastre, Acer hyrcanum, Corylus colurna, Populus tremula, Prunus avium, Fraxinus angustifolia, Carpinus betulus, Ostrya carpinifolia.*

Associates plants of the species at Kasnak Oak Nature Reserve Area, where is the best southern location of the species ere; *Quercus infectoria, Quercus coccifera, Sytrax officinalis, Daphne sericea,* at lower elevations (1400-1500m); *Juniperus oxycedrus, Juniperus excelsa, Fraxinus ornus, Fraxinus oxycarpa, Acer monspessulanum,*

Amelanchier parviflora, Amelanchier rotundifolia, Pinus nigra, Juniperus foetidissima, Berberis crataegina, Salvia tomentosa, Daphne oleoides, Marrubium globosum, Acantholimon spp., Phlomis armeniaca, Crataegus orientalis, Quercus trojana, Quercus libani, Cornus mas, Sorbus torminalis, Cerasus mahaleb, Cotoneaster nummularia, Acer campastre, Acer hyrcanum, Acer platanoides, Populus tremula, Cedrus libani, Sorbus umbellata, Ulmus glabra, Artemisia absinthium, Lonicera nummulariifolia, Cerasus prostrata, Digitalis ferruginea, Ziziphora clinopodioides, are associate plants at upper elevations (1500-2000m).

Eğirdir -Yukarıgökdere location is accepted as the best location of the species. However, Kasnak oak stands have been destroyed over years and faced with the threat of extinction because of the fact that unconsciously overused for wooden home appliances, veneer and furniture. Thin or large wooden round parts of appliances to sift granule materials or to make handmade fabric decorations; general name is “kasnak” in Turkish. The species called as Kasnak oak because of the fact that the species had used too much as raw material of kasnak production in the past. To protect this valuable resource 1300.5 hectares area near the Eğirdir Yukarı Gökdere village (37° 41´ 35´´ N, 30° 49´ 56´´ E, 1300-1848 asl) was declared as “Kasnak Oak Nature Reserve Area” on 07/27/1987

For botanical and wood anatomical examination, wood and plant samples (leaves, buds, fruits) were collected from Eğirdir-Yukarıgökdere. Plant sample stored as a record of “F4841” at the Herbarium of Süleyman Demirel University, department of Forest Botany. Properties (the dimensions of vessel, width and maximum height of rays etc.) determined using microscopic techniques and image analysis system.

Buds are covered with many bud scales and their margins are ciliate. Terminal bud of twigs is pointed and oval shaped and larger than others (5-11 mm). Bottom side of leaves are distorted, or wedge-shape. Elliptical or egg shaped leaves, which have 4-9 double deep lobes, are 5.5-16.5 X 3-9.8 cm in size. Upper surface of leaves are dark green, smooth or sparsely hairy. Underneath of leaves are pale green and have yellowish hairs. The fall colors range change from yellow to brown. Petiole is 4-16 mm long. Fruit matures in one year. Fruit cupule scales are hairy and closed tightly each other. Fruit cupule is 10-17 mm long and 14-21 mm in diameter and cupule stalk is 8-10 mm in length.

Old-aged trees have large grayish-brown color heartwood and very thin light yellowish sapwood on the cross section. Macroscopic properties of this species are characterized by its distinct (often wide) dark and light brown generally very narrow growth rings (old individuals). The early wood displays a number of large vessels .Large rays can be easily seen with eyes as yellowish or light brown lines across the growth rings perpendicular to fibers.

Wood minute anatomy of this species; characterized as ring porous, early wood pores are very wide (more than 250 um) and their shapes are circle and oval. Vessels are arranged generally alone, sometimes dual or rarely triple groups (1-4 rows) usually are occluded with tyloses in earlywood. Latewood is characterized by flame-shaped vessel alignment except very narrow rings. Earlywood passes into late wood abruptly in the narrow rings and the latewood part can not easily recognize. The microscopic view of such kind of rings seen as if only consists of large pores. Perforation plate is simple. Wood parenchyma is mostly paratracheal. Rays are heterocellular.

Dry base and air-dry base wood densities of Kasnak oak are; 690 kgm^{-3} and 739 kgm^{-3} respectively.

This paper consist of the results that obtained from projects, researches, observations and face to face interviews with local people by authors from 2002 to 2009. Detailed measurements and pictures will be given in full text.

Keywords*:* Kasnak oak**,** botanical properties, ecological properties, historical usage

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SOME SEED CHARACTERISTICS OF *QUERCUS CERRIS* L. AND *QUERCUS COCCIFERA* L. FROM PROVENANCE OF EĞIRDIR-YUKARI GÖKDERE

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Abstract

Quercus cerris L. except the North-east and East of Anatolian spread over the other main regions and *Quercus coccifera* L. is the most widespread species of Turkey. The acorns used in experiments were collected on 26th September 2008 from provenance of Eğirdir-Yukarı Gökdere where is the one of Mediterranean area that have also many hardwood species. The acorns stored moist at +4 ^{o}C until used in the experiments. In this study the acorns characteristics (acorn size and 1000 seed weight), moisture content and viability of seed (tetrazolium test, germination) and water stress at tree levels (-3.1, -6.1, -9.7 bars) on *Q. cerris* and *Q. coccifera* were investigated. The acorns size and 1000 seed weight of *Q.cerris* were better than *Q. coccifera*. Germinations were carried out on moist sand in early November 2008 and water stress tests were performed in petri disches on two layers of fitler paper saturated with the PEG-6000 (polyetylene glycol of 6000) solutions. Germination percentages of *Q. coccifera* were higher than *Q. cerris* (100 %, 76.5 % respectively) when moisture contents were 60 percent in *Q. coccifera* acorns and 53 percent in *Q. cerris* acorns. Even though, no significant differences in terazolium test results, germination percentages of both of oak species were influenced significantly at different water stres levels. However, *Q. cerris* germination percentages decrease gradually at water potential levels, water stress especially at -3.1 bars level was not effective on germination of *Q. coccifera*. The other result that germination percentage of *Q. cerris* under water stress at -3.1 and -6.1 bars levels were higher than germination on moist sand.

Key words: *Quercus cerris*, *Quercus coccifera,* germination, water stres

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SHAPE ANALYSIS OF OAK LEAVES

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In this work, Relative Complexity Measure methods were used to classify shapes of *Quercus* leaves. For this aim, contours of 84 leaves belong to the 12 different species were extracted by chain code algorithm. According to the complexity values of each leaf pairs by Relative Complexity Measure method a distance matrix has been produced which is thereafter used to construct a phylogeny. The method discriminated groups according to leaf edge typification. Unlobed leaves were divided into two groups, toothed edged and smooth edged. Those two groups were successfully clustered into species order. However, group including leaves with lobes were not resolved into species clusters. Utilization of the technique was found to be promising while combination or the correct use of parameters.

Keywords: shape analysis, relative complexity, oak leaves

ANALYSIS OF MORPHOLOGICAL CHARACTERS OF OAK ACORNS

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In order to construct phylogenetic relationships of the Turkish *Quercus*, morphological features of acorns belong to 14 species representing all 3 sections of the genus were analyzed Multivariate Statistical methods. Specimens were collected from 47 different populations over both Anatolia and Trace of Turkey. Cluster Analysis and Principal Component Analyses were carried out by using both quantitative and qualitative characters of acorns. Cluster analysis yielded numerous trees that show the phylogenetic relationships among the taxa in conformity with 3D display of projections resulted from Principal Component Analysis. Both methods support clear separation of *Quercus* and *Cerris* Sections. However, members of *Ilex* section were displayed in both results as dispersal form of units. The study also aims to reveal the uncertainty of *Q. aucheri* within the section *Ilex*.

Keywords: phylogeny, principal component analysis, cluster analysis, acorn, Quercus, Turkey

GENERAL SOIL PROPERTIES OF PURE OAK (*Quercus*) FORESTS ON NORTHERN STRANDJA-TURKEY*

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Quercus genus is so important for Turkish Forestry. Turkey is a unique oak land in the world regarding as both oak species richness and the magnitude of oak covering area. After the pines second widest spreading area belongs to oaks in Turkish forests. Oak forest consist the 22.4 % of general Turkish forest area. Also, oaks widespread in Northern Thrace where in the study conducted. Oak species cover 19,8% of Thrace (European part of Turkey).

This study was conducted on pure oak stands which are separated as conversion of coppice and including different stand types located in the administrative region of Istanbul Regional Forestry Directorate and in Northern Thrace forest site. Strandja Mountains locate on research area and it has both south and north aspects. Sample areas were chosen regarding as different aspects, stand types, replications and dominant parent materials. After the determination of pure oak forests distribution on research area, we separated the sample areas at three elevation ranges (0-250 m, 250-500 m and 500<). 250-500 m elevation level was sampled intensively on both north and south aspects. Two main parent materials were sampled on each elevation level according to stand types of pure oak forests. Stand types of pure oak forests were Ma (mean tree diameter 0-8 cm), Mb (mean tree diameter 9-20 cm), Mc (mean tree diameter 21-36 cm) and BM (degraded, canopy cover less than 10%). Each stand type was sampled with 6 replicates including different canopy covers on each dominant parent material. Total 96 soil profiles up to 1m soil depth were dig and investigated. Soil samples were taken from 0 – 5 cm, 5 – 15 cm, 15 – 30 cm, 30 -50 cm, 50 – 70 cm ve 70 – 100 cm soil depths.

After field observations and laboratory analyses some general results on some soil properties such as soil depth, soil texture, soil acidity and carbonate content were summarized in this study.

Keywords: Oak, parent material, soil, soil texture, soil acidity, Strandja.

- This work was supported by TUBITAK; project number is TOVAG-107O750.

EFFECT OF SULPHUR DIOXIDE (SO_2) GASES DURING COPPER MANUFACTURING IN MURGUL ON SOME MECHANICAL PROPERTIES OF OAK (*QUERCUS PETRAEA*) WOOD

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The purpose of the study was to determine effect of sulphur dioxide (SO_2) gases during copper manufacturing in Murgul on some mechanical properties of oak (*Quercus petraea*) wood. The sample trees harvested from Artvin-Ortaköy and Artvin-Murgul regions located in northeast of Turkey.The selection of the experimental trees, preparation of the test specimens and application of the test procedures were done according to Turkish standards. Impact bending, shear strength and Brinell hardness values (parallel and perpendicular to grain) were determined as the mechanical properties. According to results of this study no effect of SO_2 was determined on shear strength and Brinell hardness values of oak wood except for impact bending.

Keywords: Sulphur Dioxide, Mechanical Properties, Trees, Oak

DETERMINATION OF SOME MORPHOLOGICAL CHARACTERISTICS OF TWO DIFFERENT OAK SEEDLINGS (*Q. ITHABURENSIS* DECNE SUBSP. *MACROLEPIS* (KOTSCHY) HEDGE&YALT AND *Q. SUBER* L.)

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ABSTRACT

This study aims to determine some morphological characteristics of two different oak species seedlings called *Q. ithaburensis* Decne subsp. *macrolepis* (Kotschy) Hedge, Yalt. and *Q. suber* L., grown at Torbalı Forest Nursery in İzmir province. For that reason, 1+0 aged seedlings grown in polyethylene bags have been provided. In both oak seedlings; shoot height (cm), root collar diameter (mm), root height (taller root height) (cm), shoot and root fresh weight (g), the shoot and root dry weight (g), shoot height/diameter and shoot/root ratio (dry weight basis) were measured. In addition, some morphological characteristics for both oak seedlings were compared to the Turkish Standards Institution (TSI) Classifications named “Standard on Broad Leaved Forest Tree Seedling” (TS 5624/March 1988). The cork oak seedlings were found as II. quality and valonia oak seedlings as I. quality. Therefore, by this study we determined some morphological characteristics which were not defined before in Turkey for these two oak species.

Key words: *Quercus ithaburensis, Quercus suber*, seedling, morphological characteristics, TSI

SITE PROPERTIES OF VALONIA OAK (*QUERCUS ITHABURENSIS* DECNE. SUBSP. *MACROLEPIS* (KOTSCHY) HEDGE & YALT.) COMMUNITIES IN AEGEAN REGION

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Valonia Oaks are decidious trees which can be grown up to 15 m, with a broad crown and thick branches. It is one of the economical species of 18 oak species native in Türkiye. Because of the rich content of tannins, cupule is used for tanning process in leather sector. Accorn is used for feeding. Some agricultural tools are made from its trunk and wood is used for fuelwood.

Knowledge about ecological conditions of species which has such a big economical value is very limited. Therefore to do detailed studies on species is essential. Recently with the increasing demand for natural products the demand for Valonia oak has also increased. So this knowledge will be useful to expand Valonia oak area which has been narrowed.

In this study, 40 sample plots have been sampled from Valonia oak areas in Ege region. Studies about site properties have been done in field and all plant species in the area have been recorded. Soil samples have been collected from soil profiles and analyzed in laboratory and all results have been evaluated.

Keywords; Valonia Oak, Site properties, Ecology

DISTRIBUTIONS OF SPECIES RICHNESS OF TURKISH *QUERCUS*

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The geographical distribution of Turkish Oaks belonged 23 taxa was analysed using Geographic Information System (GIS) techniques according to 2755 georeferences stored in a special *Quercus* database. The analyses of distributions were carried out on the 29 grid squares of Davis which were corresponded to two degrees of latitude and longitude squares, ranging within 36°N-42°N latitude and 26°E-44°E longitude. The results were evaluated by some statistical and taximetric analyses for comparisons of the grid squares. Three grid squares of A1, A2, and A3 contained the highest richness of *Quercus* taxa. The least richness of taxa was also obtained in the A9 and C8 grid squares. The remained grid squares represented moderate richness of taxa. North Western Anatolia, including Thrace, showed the highest numbers and richness of taxa. However, eastern and south east of Anatolia were having the poorest richness and the numbers of *Quercus* taxa.

Keywords: richness, grid squares, GIS, Turkish Oaks

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OUTLINES OF THE PHYTOGEOGRAPHY OF THE MEDITERRANEAN OAKS

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In the regions facing the Mediterranean Sea, the Genus *Quercus* is highly diverse. The ancestors of most of the present day sections in the Genus established in the Tethyan area first in late Oligocene, with representatives of both Arctotertiary (deciduous or semi-deciduous), as well as Indo-Malesian (evergreen) stocks. At present sclerophyllous evergreen oak-forests border the coasts of the Mediterranean Sea and reach further inland from the Atlantic coasts in the Iberian Peninsula, with isolated outposts scattered as far North as along the coasts of Bretagne. Deciduous thermophilic and semi-deciduous species cover large areas in the sub-Mediterranean districts in Southern Europe and Anatolia, while the mesophilic species of more temperate district in the Mediterranean countries are widespread over most of Europe, from the Atlantic coast to the Urals and Caucasus bordering the biome of the steppe.

In this framework, particularly intriguing is the geographic pattern of species diversity, stressing the importance of a major core in E Anatolia, reaching Caucasus and the Zagrosian regions. A minor disjuncted outpost of representatives of Anatolian sections of the Genus is restricted on the Iberian Peninsula, suggesting reiterated extinction events in central Southern Europe (Italian peninsula and Northern Balkan) during the Neogene and impressive range pulsations following the climatic fluctuation of the Quaternary, thanks to the spreading ability of the acorns.

Circumstantial evidence suggests that the floristic and vertical structure of old-growth, late-successional, undisturbed oak forest is favourable to the coexistence of a much larger number of arboreal associates than in any other forest community of any biome in the area. The immense value of these communities for nature conservation is unquestionable. Nevertheless the extraordinary capacity of resprouting exhibited by the oaks, especially the more thermophilic ones and by their most important arboreal associates in the stands (*Ostrya, Carpinus, Acer, Tilia*), along with the extremely high age reached by their stools, makes these communities much more resilient to disturbance than any other types of forests. This accounts for their persistence in anthropogenic fire-prone environments with Mediterranean-type climate and for their capacity to withstand human disturbance (coppicing) since time immemorial, providing excellent timber for thousands of years and apparently mirroring the range of the earliest development of iron metallurgy in the Middle East and in the Balkan.

In this sense the forest of oaks in the Mediterranean countries represent the most reliable source of phytodiversity and renewable energy in an unpredictable and changing environment

Despite of the global increasing consciousness about environmental issues, major crucial threatens to the conservation of the oak forests are represented today, in many Mediterranean countries, by rapid changes in land use, paradoxically following large scale national forestation projects, which promote replacing of stands of oak forests and woodlands with conifer plantations.

The preservation of stands retaining their primeval character is therefore of immense value in order to provide living examples of efficient coenological structures only controlled by the natural determinism, one of the most challenging environmental issues in the policy of resource management of the countries in the Mediterranean Near East.

Key words: *Quercus*, phylogeny, disjunctions, conservation

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OAK DECLINE IN EAST GERMANY – SYMPTOMS AND BACKGROUNDS

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For more than two decades, two oak species – the pedunculate oak (**Quercus robur**), and the sessile oak (**Quercus petraea**) – have been counted among the most damaged tree species in the north-eastern lowland of Germany. According to the observed loss of leaves and crown damage (death of fine twigs and branches), 30-45 % of all oaks are strongly harmed. Trees ranged from 60 to 120 years of age are especially affected.

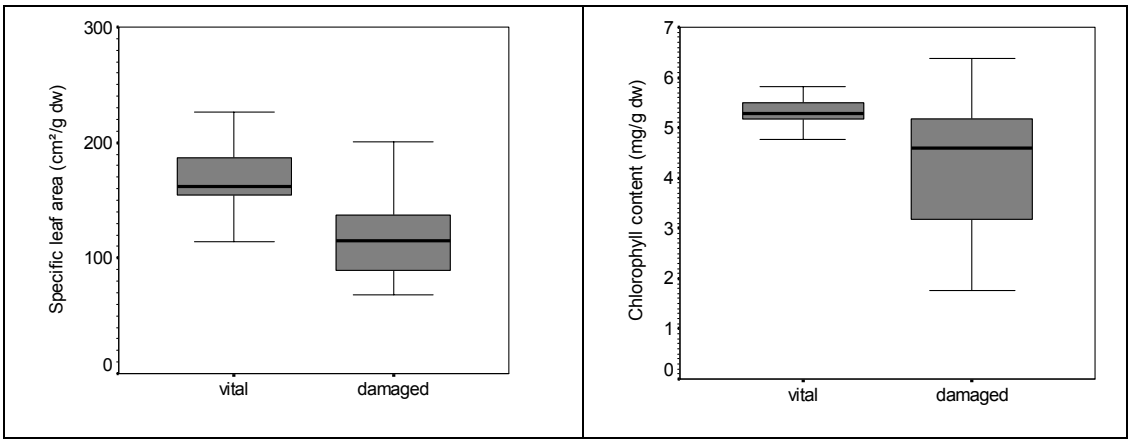
On the other hand, the importance of oaks is still increasing, particularly for the conversion of pure Scots pine (*Pinus sylvestris*) stands to oak-mixed stands. Therefore, we have investigated the symptoms and potential causes of oak decline interdisciplinarily, incorporating data from nine study sites of sessile oak for five years. We want to identify and distinguish predisposing decline-inducing (primary) factors and amplifying or mortifying (secondary) stress factors and to develop countermeasures.

The phenomenon of oak dieback in Germany is nothing new. At least four periods of oak dieback have previously occurred. Those were potentially caused by a combination extrem weather conditions (summer dryness, strong and late frost) with defoliation of insects and fungies. The current period of oak dieback how ever differs in many respects (time period, size of the affected area e.g.).

Non of the classic theories of oak dieback (defoliation by caterpillars, attacks on the weakened trees by oak splendour beetle (*Agrilus biguttatus*), root-pathogen infections, eutrophication, frost damages, inappropriate provenances) can explain the observed damages in north eastern Germany on its own. No *Phytophthora quercina* could be found on the sandy, nutrient-poor, dry, and acid soil of the oak stands. Although the drought periods in 1999, 2003 and 2006 enhanced the exposure to stress, symptoms of damage could be recorded during the 1990s with higher precipitation too. Extensive analysis of leaves confirmed, that even heavily damaged trees are actually well supplied with nutrients.

Bleeding spots at the trunks, which expand further, rank among the noticeable symptoms. Only in some cases, bleeding spots were associated with points of attack by the beetle *Agrilus spec.* on a weakened oak.

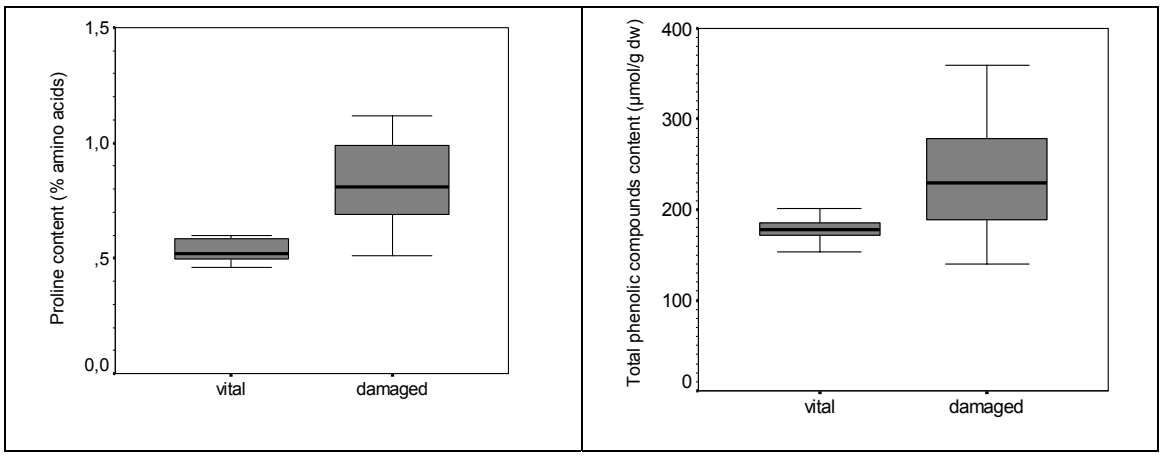
Ecophysiological analyses of leaves and wood samples of sessile oak (*Quercus petraea*) revealed conspicuous biochemical aberrations. We compared the damaged and vital trees with respect to absolute and specific leaf area, as well as water and chlorophyll content of the leaves. All four parameters were significantly decreased in damaged oaks (Fig. 1a, b).



(a) (b)

Fig. 1: Specific leaf area (a) and the content of chlorophyll (b) total phenolic compounds (b) in leaves of vital and damaged oaks (*Q. petraea*)

We also compared stress responses in leaves in damaged compared to vital trees. The content of phenolic compounds, free amino acids (total), carotinoids, ascorbate, and proline of leaves were higher in damaged trees (Fig 2a, b).



(a) (b)

Fig. 2: Content of proline (a) and total phenolic compounds (b) in leaves of vital and damaged oaks (*Q. petraea*)

In addition, stems of more severely affected oaks rejected larger amounts of volatile ethylene. Importantly these markers of drought stress were found under well water

supplied conditions. These unexpected findings indicate a disturbance of the water uptake of the roots.

The decisive changes, however, are found at the roots and in the rhizosphere: Damaged oaks displayed a significantly decreased root density, especially in the upper layer of soil (0-10 cm) (Fig. 3). In the periphery of the roots as well as in mineral soil the mortality of fine roots is significantly increased, while the density of fine roots in immediate proximity to the trunk rises.

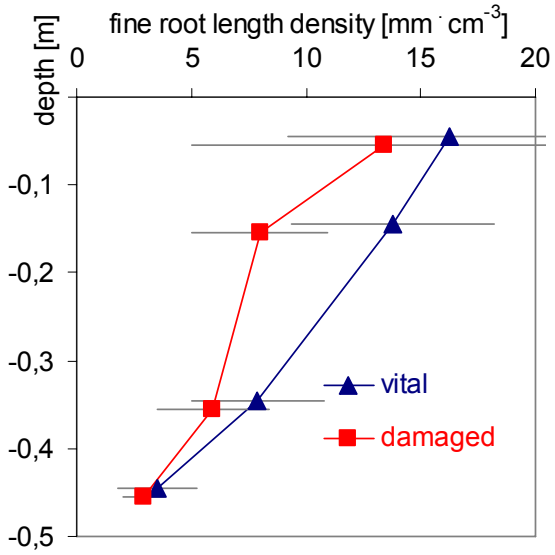


Fig. 3: Length density of fine roots of vital and damaged oaks in different depth levels

Likewise, the CO_2 content of soil regions close to the stem of affected trees rises significantly. At these spots, the CO_2 concentration in the soil was found to be two times higher than usual. In addition, the late phase of oak dieback is often characterized by *Armillaria spec.* infections. Besides, the connection between root and trunk is weakened by root affecting the primary branch roots close to the stem, leaving the oaks prone to uprooting by minor storms.

From these results we derive hypotheses about causal interactions leading to oak dieback. The *key factors* are the crown cover and the vitality of the fine roots. Due to the silviculture of the high density of stands - acting as a key predisposing factor- the area of the crown cover and the total leaf area is reduced. For aged oaks this may lead to a severe disturbance of the assimilation and defence. Under these conditions the vulnerability increases when further stress factors like water stress, warm winters, late frost, feeding insects occur in addition. The resulting decrease of carbohydrate content, especially starch

(of stems and roots) leads to an undersupply of fine roots and to a higher mortality of roots. The root degradation entails a higher CO_2-content and reduces the capacity of water uptake, resulting in a stress response. This multi level reduction of vitality results in a decrease of defense compounds and leaves the oak vulnerable to attacks by pathogens, insects and fungy. But more investigations will be necessary to confirm and compliment these hypotheses (Fig. 4).

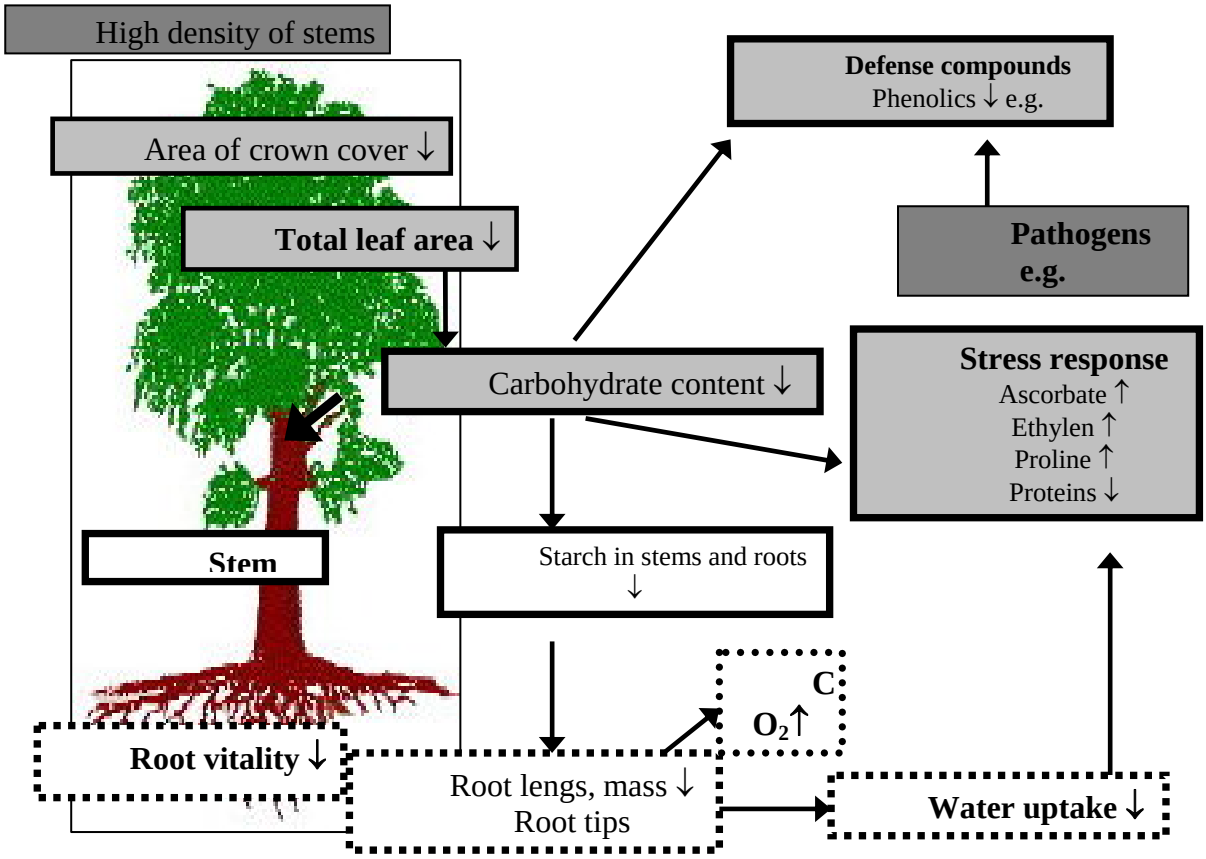


Fig. 4: Conclusions and hypotheses of oak decline in East Germany

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DECISION SUPPORT SYSTEM ON OAK (*QUERCUS*) BIOMASS ESTIMATION*

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Decision support system users have administrative skills and they have generally working trend against to time limitation in several sectors including forestry. For these reasons, facilitate of data enter for users, submission of system results and data, rapid and effective interpretation of findings and integrity of all these components have particular importance.

Decision Support System (DSS) as a system can be defined as “giving support to administrator who is trying to solve a semi-structural problem with the aim of data and suggestion submission”. DSS is an organized integration of persons, procedures, data sets and equipments that are used to solve a definite decision problem.

Identifications and submission of several subjects related to a work problem in a form suitable to computer aided working are very important. In other words, it must firstly be imagined that how the problem can be described in a software environment, and then, transforms providing to understand the reasons of problem should be applied.

In this study, an effective decision support system was composed for the oak biomass estimation. Data of decision support system were obtained from harvested 503 sample trees among measured 6441 trees on total 236 sample plots of the project titled “Determination of health condition, biomass, carbon sequestration and faunistic characteristics on conversion of coppice oak ecosystems in Northern Thrace, TUBITAK-TOVAG-107O750”.

Firstly, appropriate data enter forms were prepared due to description and submission of biomass data suitable to work in computer aided system, and to compare measured values such as diameter, height, crown diameter and transparency ratios of all trees in the sample plots according to regional forestry administration, local forestry administration, sample plot number, parent material, aspect, altitude, slope, tree species, stand type, stand age and canopy closure etc. Further planning processes following these data enter forms can be set in order as given below;

- Composing a macro program determining statistics of sample plots and sample tree and select of sample tree according to this program,
- Preparing of data enter forms belonging to sample tree,
- Transfer of values belonging tree components and fresh weights of tree components’ sub samples to data lists on MS Excel,

- Compose of B-C-N forms estimating fresh-dry weights, carbon and nitrogen values belonging to single tree components on MS Excel,
- Data transfer of sample plots and single tree components to MS Access database according to data lists including B-C-N values,
- Compose of biomass database including databases of whole sample plot, fresh weight and dry weight of single tree,
- Multi dimensional query of data extracting from databases as a summarized table and summarized graphics by the way of OLAP (Online Analytical Processing),
- Developing of biomass estimating models, determination of relations among variables by the way of multivariate statistical analysis techniques

DSS design tools such as Relational database, Spreadsheets, Programming languages; On-line Analytical Processing Systems and Statistical packet programs were used to compose an efficient biomass decision support system and to serve various decision alternatives for decision makers in this study.

In conclusion, composed biomass decision support system provides; 1- facilitation of data enter for users, 2- submission of results and data gained from system, 3- rapid and influential interpreting of results and 4- integrity of all components.

Keywords: Biomass, Oak, Decision Support Systems, Statistics, OLAP.

* This work was supported by TUBITAK, project number is TOVAG-107O750.

WHY IS IT IMPORTANT FOR FUTURE MANAGEMENT TO MONITOR THE MORTALITY RATES OF OUR ANCIENT OAKS?

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Ancient oak trees host a huge range of organisms, many of which are rare and specialised. Many of the ancient oak trees in Sweden and England are more than 500 years, some even as much as 1000 years old (Alexander *et al*, 1998, Read, 2000, Green, 2001). Population data with regard to mortality rates and regeneration rates in natural oak populations is generally poor. There is much data related to forestry and trees produced for timber. Questions such as how many young oak trees do we need in order to have one five hundred year old oak, how many old oaks do we require in order to have a sustainable habitat for the rare and specialised associated species and what is the "natural" mortality rate of our ancient oak populations remain either unanswered or unclear. Our perception is that ancient oak populations are relatively stable, but this is not the case, it is just often on a longer timescale compared with other habitats.

The importance of understanding the losses of ancient trees cannot be underestimated. By collecting data on mortality and regeneration we can model population and consequential habitat loss which will help to direct conservation management in the future and provide an early warning system. This information will help guide site managers as to whether planting is required, whether veteranisation is required and on what landscape scale conservation management and site protection needs to take place in order to conserve the species associated with our ancient trees (Fay & Rose, 2003, Bengtsson, 2007, Bengtsson & Fay, 2009).

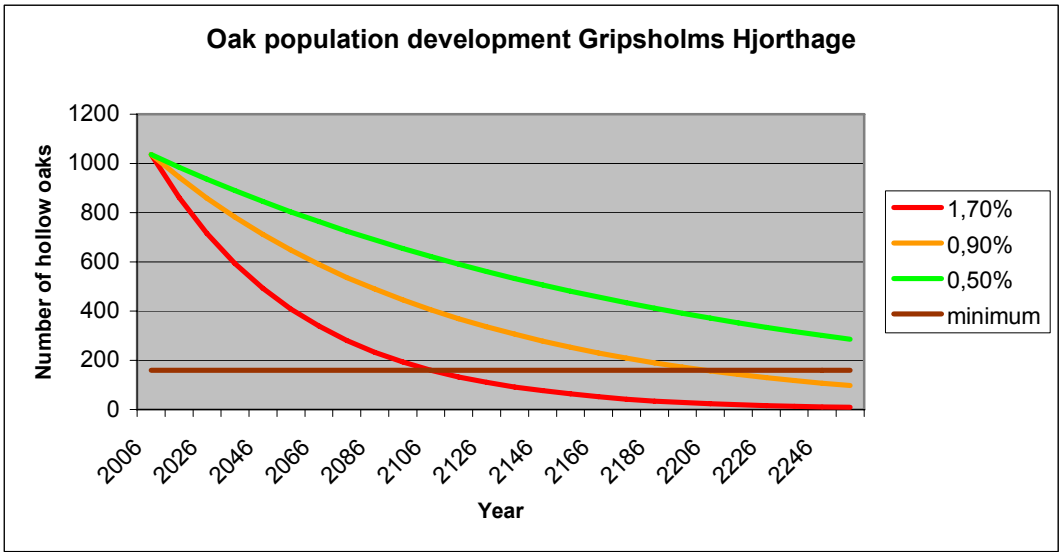
Reliable mortality data can only be obtained from tree populations where individual trees have been tagged. There are very few sites in Sweden and the UK where this has taken place (Bengtsson, 2007, Bengtsson & Fay, 2009, Read *et al*, 2010). Mortality rates that have been recorded vary from 0.5 – 1.8%. A study in Östergötland, Sweden, suggested a mortality rate of 1.3% for ancient oaks (Ranius et al, 2009) which is in line with what has been reported from England.

In 2004 and 2005 a number of sites in Sweden were tagged and surveyed. This provides the opportunity to collect actual mortality data from these sites in different conditions (overgrown without grazing and more open with active management such as grazing). A project, initiated in 2010, involves revisiting these sites and assessing any changes in

condition (alive or dead) of the individually tagged trees. This is a short time in the life span of an ancient oak, but provides a good starting point for future monitoring and can help produce simple models of population structure and development. This survey also allows assessment of any differences in mortality rates where the sites are overgrown and shaded compared with those which are more open.

According to some work carried out by Bergman 2003, based on the occurrence of two beetle species living in wood mould in hollow trees, a minimum number of hollow trees (160) were calculated in order for the populations of these beetles to be sustainable. When producing models showing the development of a population of ancient trees, this figure of 160 hollow trees can be used as a minimum measure of sustainability. The example given below shows when the minimum threshold will be reached based on different mortality rates from a nature reserve in eastern Sweden, Gripsholms Hjorthage. If the mortality rate stays at 1.7% then all the hollow trees will be lost within 100 to 150 years. There has been very little regeneration in the last two hundred years on this site and thus the next generation of ancient trees will need at least two hundred years to develop (Bengtsson & Bengtsson, in prep.). If this scenario is correct it is of vital importance to broaden conservation efforts into the surrounding landscape.

Hördalen, Southern Sweden has a mortality rate of 0.6% per year over a five year period, but over the coming three years it will reach 1.7%. This highlights that mortality does not have a steady pace.



Alexander, K.N.A., Green, E.E. & Key, R.S. (1998) Managing our Ancient Trees. Tree News, The Tree Council

Bengtsson, V. 2007. Assembling evidence of the sustainability and biodiversity of ancient and veteran trees - A review of the current information and evidence for the Woodland Trust, Ancient Tree Forum Partnership. Unpublished. Woodland Trust.

Bengtsson, V & Fay, L. 2009. 2009 Veteran Pollard Survey Ashtead and Epsom Commons, Surrey. City of London, Ashtead Common.

Bengtsson, V & Bengtsson O. 2009. Vårdplan för träd och buskskiktet inom naturreservat Gripsholms Hjorthage. In press.

Bergman, K-O. 2003. Bedömning av långsiktig överlevnad för hotade arter knutna till ekar på Händelö i Norrköpings Kommun. Natur i Norrköping 3:03. (Assessment of the long term sustainability of threatened species associated with oaks at Händelö in the district of Norrköping).

Fay, N. (2002). Environmental Arboriculture, Tree Ecology and Veteran Tree Management. The Arboricultural Journal, Vol 26, No 3. 213-238.

Fay, N & Rose, B. (2003) The Importance of Surveying Veteran Trees. An emerging crisis in old tree populations. Proceedings of "Working & Walking in the Footsteps of Ghosts". International Conference, Sheffield Hallam University. (Unpublished).

Green, T. (2001). Should ancient trees be designated as Sites of Special Scientific Interest? British Wildlife. 12 (3).

Ranius, T, Niklasson, M & Berg, N. 2009. Development of tree hollows in pedunculate oak (Quercus robur). Forest Ecology and Management 257 (2009) 303–310

Read, H. (2000) Veteran trees: A guide to good management. English Nature.

Read, H, Wheater, P, Forbes, V & Young, J. 2010. The current status of ancient pollard beech trees at Burnham Beeches and evaluation of recent restoration techniques. Q. Journal of Forestry. April 2010.

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MANAGING OAKS IN THE NATURE RESERVE "BOSCO DELLA FONTANA" (NORTHERN ITALY) AND NATIONAL GUIDELINES FOR MONITORING OAK-ASSOCIATED SAPROXYLIC BEETLES

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The Nature Reserve "Bosco della Fontana" is one of the last and largest remaining examples of floodplain forest in the Po Valley (Northern Italy). Conservation of this site is of fundamental importance for ecological, biological and historical reasons. The forest is characterized by the hornbeam, *Carpinus betulus*, and the common oak, *Quercus robur*, and is currently managed with the long term aim of restoring the dynamics of an "old growth forest". One of the main problems is the presence of red oak, *Quercus rubra*; this species was introduced in the Reserve during 1952-1955 and has progressively become dominant in the forest composition. In the period 2000-2003, through the LIFE Nature project NAT/IT/99/6245, the elimination of this species started together with the conversion to different kinds of coarse woody debris. This allows reaching the double aim of increasing the dead-wood stock and creating environmental conditions that might ensure the survival of the common oak.

In 2008 the Italian Environmental Ministry has funded a project regarding monitoring and conservation of saproxylic faunas. The main goals of the project are to provide guidelines for conservation and standard methodologies for measuring population consistency and trends, as well as habitat range, as required by the Habitats Directive (92/43/EEC). The oak-associated species *Lucanus cervus* (Coleoptera Lucanidae) and *Cerambyx cerdo* (Coleoptera Cerambycidae) represent target species of the project. Specific protocols have been developed and preliminary tested in the field. The methods proposed involve minimal impact on the species and consist of direct observations along transects, capture-mark-recapture and trapping.

PROMOTING THE CONSERVATION OF ANCIENT OAKS *QUERCUS ROBUR* IN EPPING FOREST, UK

Jeremy Dagley

City of London Corporation, Uk. (Open Spaces Department, Epping Forest Division)

Epping Forest is 21km in length and stretches out from inner east London to its surrounding countryside in one of the most densely-populated areas in Europe. It was saved in 1878 by the City of London Corporation from destruction by London's industrial expansion. The Forest covers an area of 2,450 hectares completely open to public access and protected for "recreation and enjoyment". It is used by hundreds of thousands of visitors each year.

Over 1,600 hectares (65%) of this forms an internationally important *Natura 2000* site protected by European legislation. The Forest is an ancient wood-pasture site renowned for its ancient pollarded trees of Hornbeam *Carpinus betulus*, Beech *Fagus sylvatica* and Oak *Quercus robur*, all over 300 years old. There are more than 50,000 pollards making Epping Forest the most densely pollarded site in the UK.

This important heritage of ancient trees is being mapped by GPS onto a Geographical Information System (GIS) database with the aim of mapping the positions of all individual Oak and Beech pollards. So far around 15,000 ancient pollards have been mapped. The Oak pollards number around 8,000 and over 30% of these have been individually mapped. Leaflets about the ancient trees are available to the visiting public and the new maps will be used to update these. Walking routes are also being devised for visitors wishing to see the ancient trees.

The biodiversity of Oak in Epping Forest is very important, in particular for rare fungi and saproxylic beetles. Of the saproxylic beetles there are 44 European red-listed species of which 3 are classed as near-threatened (NT). However, the Oak pollards themselves are threatened and the loss of the pollards is between 1 to 2% a year. Most significant amongst the threats are 1) physical collapse; 2) over-shading by younger trees and 3) disease causing chronic oak decline. In 2009 a large proportion of Oaks were defoliated by caterpillars and then adversely affected by Oak Mildew *Erysiphe alphitoides* such that many trees did not come into leaf throughout the whole growing season. Further survey work is planned during 2010 to examine whether this defoliation/mildew cycle is resulting in the decline of the trees.

In response to these threats conservation management work involves clearing young trees from around the ancient Oaks and reducing the crowns of the pollards to stabilise them. Given the thousands of old Oaks at Epping Forest the management is being concentrated on between 400 – 500 "keystone" Oak pollards. The aim will be to involve volunteers from amongst the public, as tree wardens to monitor the health of the "keystone" Oaks each year.

The work on "keystone" trees is part of a bigger project encouraging understanding of the importance of Epping Forest amongst our visitors. Centred on the historic Queen Elizabeth's Hunting Lodge, built by Henry VIII in 1543, there will be a new visitor centre opening in the next 3 years which will celebrate the heritage of wood-pasture and its

ancient trees. This project has already seen the start of a new education initiative. “Discovering Epping Forest” is providing fieldwork classes for 25 schools over 3 years, introducing the Forest and its ancient Oak trees to hundreds of local school-children, and their parents, many of whom have never before visited the Forest.

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KERMES OAK (*QUERCUS COCCIFERA* L.): AN IMPORTANT TREE SPECIES FROM AN ECOLOGICAL PERSPECTIVE

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Kermes oak (*Quercus coccifera* L.) is one of the most widespread tree species of Turkey. It is a typical oak species of Mediterranean region where it can reach up to 1700 m altitude. Although it can grow up to 2-3 m in height in most areas, it can also form a fully-grown tree where site conditions are favorable. Commonly, most of its distribution area includes deforested and degraded sites with Mediterranean climate, where Turkish red pine (*Pinus brutia* Ten.), Anatolian black pine (*Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) Holmboe) and Taurus cedar (*Cedrus libani* A. Rich) forests were once abundant. Dense forests of other Mediterranean species often limit the occurrence of this species in its natural distribution area. It can be found in many different types of parent rock and soil. However, shallow and insufficient crack system in karstic landforms often appears to be a limiting factor in its occurrence in many sites.

Kermes oak prevents erosion on sites where natural forest cover is degraded or completely destroyed. This feature gives it a special importance on such sensitive lands in terms of combating desertification. As it contributes to carbon storage, it is also important in global warming and climate change. It is also essential for wildlife since its leaves, shoots and acorns are consumed by animals such as goats. In addition, since it is an evergreen species with dense shoots, it provides shelter for animals such as rabbits and partridges. As the site conditions gets favorable, this species can also have an important potential for energy forest establishments. In practice, significant amount of afforestation and reforestation practices are performed in degraded areas of kermes oak sites, with the intention of restoring it back to healthy, more productive forests. In such cases, their height can be an important indicator for site productivity.

Keywords: *Quercus coccifera* L., land degradation, erosion, wildlife, afforestation, reforestation

500 YEARS OF OAK FOREST MANAGEMENT IN MEERDAAL FOREST (FLANDERS, BELGIUM)

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For over 500 years the forest of Meerdaal, 30 km east of Brussels, has been renowned for its high quality oak timber. Using historical documents and maps, the long-term management of this forest could be reconstructed. It is shown that Meerdaal Forest was an important, skilfully managed source of income for its feudal owner. For centuries the oak stands were managed as coppice with standards, with a relatively high share of standard trees. Cutting cycles varied over time, ranging from once every 20 years to once every 12 years.

Forest grazing, acorn picking and herb harvesting were properly regulated in regard to a sustainable use of the forest's resources but were gradually restricted over time, and already abolished during the 18th century. Especially the relationship between natural regeneration and forest grazing is discussed in more detail.

Over the last century, the forest was subjected to a conversion from coppice with standards to high forest. It showed an important increase in overmature trees and dead wood. These changes resulted in dramatic losses in light demanding species like butterflies, but also generated an important new potential for old-growth-related biodiversity (e.g. saproxylic beetles, fungi and mosses).

SOUTOK–HOW TO SAVE OAK DOMINATED FLOODPLAIN FOREST

Antonin Krasa

Institution: Agency for Nature Conservation and Landscape Protection of the Czech Republic

The area of Soutok, covering more than 10 000 hectares, is the biggest floodplain forest not only in the Czech Republic but in Central Europe as well. It is situated in the most southeastern corner of Czech Republic between Morava and Dyje rivers and is composed of inundated meadows, various water bodies, dry alluvial dunes and floodplain forest dominated by common oak (*Quercus robur*). Present-day composition is the result of long-term changes starting in medieval times. Since then people caused big changes by cutting forest and growing crops in uplands, which resulted in more material being carried by rivers and deposited in extensive lowlands. These changes continue until today but their speed has accelerated and their form shifted depending on alternations in land use. It results in accelerated species-loss of many fungi, insect and bird species dependent on this oak forest and severe preservation actions are needed.

Unique area

There are more floodplain forests in Czech Republic but Soutok is the biggest and most species rich. It is famous because of dozens of specially protected species of both national and international significance level live there and the abundance of individual species is also exceptional. Among them is especially rich assemblage of saproxylophagous beetles as long-horn beetles, buprestids or elaterids. Fungi, flowering plants, fish, amphibians and birds also show very high biodiversity. The uniqueness of the area is highlighted not only by the number of species and their high abundance but also by the presence of so many species with different and interfering requirements on a relatively small area. For many such species Soutok is the only place, where they are found in Czech Republic and neighbouring countries.

History

Until the 1940s, Soutok was the property of Lichtenstein family, who on a wide scale altered the appearance of the landscape by vast park-land oriented modifications but they also used part of forest for commercial purposes. The present-day diverse landscape mosaic composed by dense forest and meadows with remnants of sparse pastoral forest and solitary oak trees is result of their activities. The situation changed dramatically after WWII when the forests were nationalized and the whole area became part of a border region closed to the public and with many restrictions. Later, the intensity and form of activities there changed, water level declined as a consequence of dyke construction along both rivers, and a game reserve was established there. All this resulted in present-day loss of species richness and the overall degradation of the area.

Problems

Although very unique, Soutok is not adequately protected by Czech Republic nature protection law and the vast majority of the area is used as commercial forest. Together with water level decline, abandonment of traditional practices and current intensive logging, it results in problems which are very hard to solve. Newly planted forests are uniform in age and structure and are too densely planted, so light intensity is very low inside. Logging of old forest is extensive and left standard trees are unusual. Another problem is mechanical substrate preparation before reforestation which destroys all bigger wood parts and stumps. This practice negatively influences fungi, woodland plants, and insect species such as stag beetle (*Lucanus cervus*) and others. Solitary trees, which are most important hosts for heliophilous saproxylophagous insects, age, dry up and die out. Common oak propagation ability is lower as a consequence of water level decline and its saplings are not able to grow in overshadowed vegetation so forests have to be replanted by men. Another big problem is the Dutch elm disease, which kills elder elms who are important host species for many buprestids. Problems in Soutok are not related only to forest and oak or elm trees but these are most severe and influence so many species so we have to concentrate on them.

Solutions

The best solution to majority of problems listed above is dyke removal and a radical change in management. However, this is not possible today, as nature conservation is perceived as a mere appendix of profit oriented economy. The former is not possible at all so we concern on forest management changes. One of the possibilities is legal restrictions, another is compensatory payments and last but not least, there are active measures to be taken. We prepared a list of remedial measures which contains majority of management changes needed. These are: allowing spontaneous processes without man interventions in part of the forests (birds will benefit), partial cutting of dense forest to get there more light (for heliophilous beetles), transformation of tens of hectares into coppice with standards, planting of new solitary trees or pollarding (for insects in general). There are also plans for forest grazing, but this is strongly opposed by forest managers and it is not allowed by Czech Republic law. Other measures, such as small pond creation is aimed at amphibians or fish. Unfortunately, foresters do not understand the necessity of these measures to protect the unique fauna of the floodplain oak forest and convincing them is our first and most important goal.

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ECOLOGY AND MANAGEMENT OF MIXED OAK FORESTS OF *QUERCUS SUBER* AND *Q. CANARIENSIS* IN SOUTH SPAIN

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Mixed oak forests of evergreen cork oak (*Quercus suber* L.) and semideciduous Algerian oak (*Q. canariensis* Willd) cover more than 90.000 ha in South Spain. The forest composition has changed during the last century. Traditional management favoured *Q. suber* for cork oak production (about 16,000 metric tons of cork is harvested every year), while *Q. canariensis* was used for charcoal and fuelwood. On 1989 the area was protected as "Los Alcornocales Natural Park", to promote a sustainable use of forest resources.

We present results about the landscape segregation of the two oak species: *Q. canariensis* dominates the stands with more fertile and humid soils on valley bottoms while *Q. suber* is more abundant on slopes, but they also form mixed stands. The two species differ in regeneration niche. In a comparative study we found that *Q. canariensis* oaks dropped the seeds earlier; they were less preferred by predators; and their seedlings had higher survival after summer. We discuss the importance of regeneration niche differences for the oaks coexistence.

Key words: cork oak, management history, regeneration niche, seed predation, seedling establishment.

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THE WOOD-PASTURES FROM SAXON TRANSYLVANIA, ROMANIA: KNOWLEDGE, CONSERVATION STATUS AND TRENDS

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In the era of global land-use change, the cultural landscapes of Europe – including wood-pastures – and their characteristic biodiversity developed following a long tradition of land-use are receiving a continuously growing attention, highlighting the conservation importance of maintaining traditional practices and knowledge. Although there are closely connected to the history of mankind, land-use states and transitions are still poorly understood in traditional landscapes due to their complexity, which explains in a way the large number of decisions that continue to affect these landscapes in a period when there are more and more efforts working for their conservation. Because both natural prerequisites and history (social, cultural and economical – reflected in land-use) are influencing their present-day state, traditional landscapes are increasingly valued also as important reference areas that might provide good examples for sustainability.

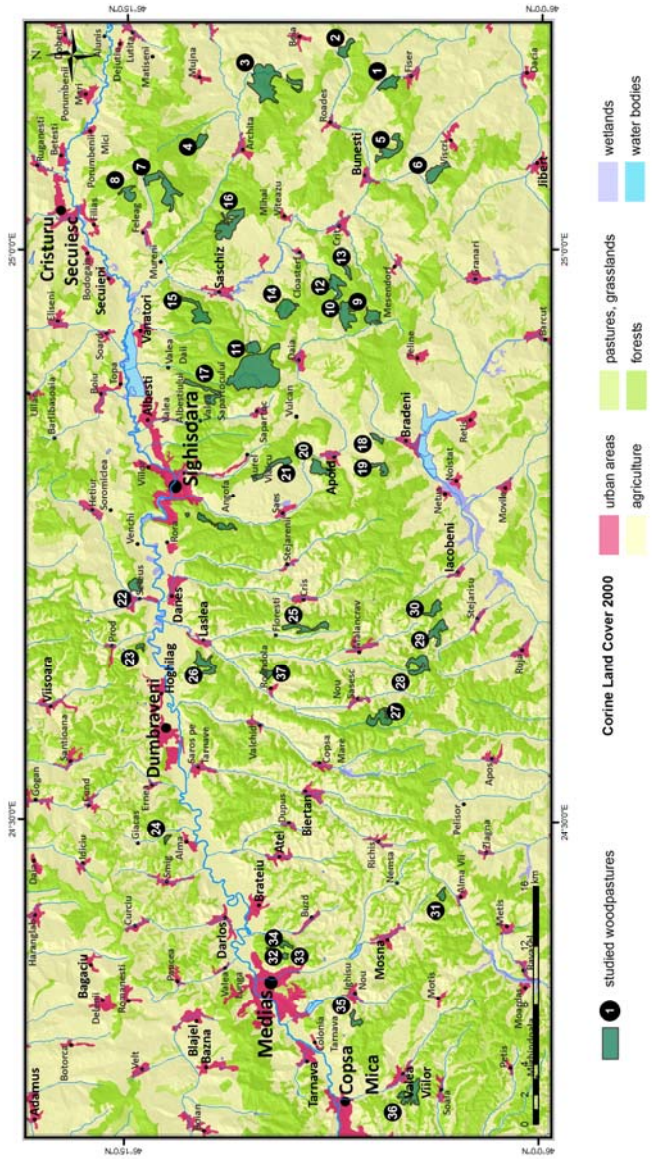
Wood-pastures, these open, grazed habitats, with a mosaic of grassland, shrub and tree patches, frequently called “acorn woods” in the Carpathian basin, are of high biological and cultural value and have become a threatened ecosystem in Europe. Their general character is given by the presence of a large number of scattered trees (most frequently oaks), contributing to the diversification of habitat conditions due to the modified humidity regime and light conditions resulting from the presence of these mature, often centuries-old trees.

While there are several reports showing abandonment, shrub encroachment, weed invasions, and even their disappearance in Western and Central Europe, wood-pastures are still active and maintained around several Saxon villages from Transylvania. Although neglected by the current ecological literature, an important amount of active traditional knowledge regarding their history and use and several sources of historical data are favouring their future appreciation and conservation management.

The ecological study of wood-pastures in Transylvania is relatively recent, and started from the Breite Nature Reserve (near the town of Sighisoara), one of the largest and most probably the oldest partially active wood-pasture in Southern Transylvania, and the only one that is currently protected. The Breite is mostly known because of the over 600 scattered or locally grouped mature oaks, many of which are several centuries old, but it is also an important site for numerous plant and animal species, their presence in the area being of great scientific and conservation interest. Following the recognition of its unique value and conservation importance, and the designation of a large area as Natura 2000 site, including several similar areas, the mapping and study of wood-pastures in the

region became of interest and actuality. Following a mapping project started in 2009, up till now 36 of such habitats have been identified, with over 150 oaks having a circumference larger than 4.7 m, while the largest oak had a circumference of 9.3m.

The aim of this paper is to present the current status of knowledge regarding this special habitat type in Saxon Transylvania, the major identified threats and trends and the ongoing or planned conservation management activities.



THREATS TO OAK DOMINATED STANDS IN BELGRADE FOREST, ISTANBUL (IN CASE OF DEER BREEDING AREA)

Aytekin Ertaş

Belgrade forest is one of the outstanding forested lands in İstanbul. It covers 7500 ha area and oak species are dominated 75% of the area. Stability of the oak dominated stands is decreasing. Storm toppling and dieback are common in the oak dominated areas. According to the last records, every two years intervals blowdowns are occured. 13.293 cubic meter wood was harvested, because of uprooting and dieback in Bentler forest district. Effects of the slope, slope position and aspect on the blowdown were evaluated.

Fall down of the trees were observed mainly on upper slopes, 15- 40 % slopes and Northern facing aspects in deer breeding area. Deer browsing also is an important factor on the health and stability of the trees. Deers are over populated and soil compaction is a serious problem.

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ECOLOGICAL CONDITIONS OF DYER'S OAK (*QUERCUS INFECTORIA* OLIVIER SUBSP. *BOISIERI* (REUTER) O. SCHWARZ) DISTRIBUTION AREA IN WEST ANATOLIA

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Quercus infectoria which is one of the species of 18 *Quercus* species native in Türkiye is typical being of semi-evergreen. It is shrubs or bushes 1–4 m in height, but if it is not being degraded can be grown up to 20 m.

There is two subspecies of *Quercus infectoria* distributed in Türkiye. One of them is *Quercus infectoria* subsp. *infectoria* which exists in northern and northwestern of Anatolia. Second one is *Quercus infectoria* subsp. *boissier* that has wide distribution area. It exists in Western, Southern and Eastern Anatolia.

Dyer's oak which has such a wide distribution area is neglected scientifically like other oak species in Türkiye. There is not sufficient knowledge about species and its properties. Therefore studies related species must be done.

It was studied with 97 sample plots from *Quercus infectoria* subsp. *boissieri* area in Western Anatolia. Studies about site properties were done in field and all plant species in the area were recorded. Soil samples have been collected from soil profiles and analyzed in laboratory and all results have been evaluated.

Keywords; Dyer's oak, *Quercus infectoria*, Ecological conditions

SPATIAL ANALYSIS OF OAK FORESTS IN ISPARTA REGIONAL FOREST DIRECTORATE WITH GEOGRAPHIC INFORMATION SYSTEM

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Aspect and altitude from the sea level causing local climate changes are important ecological factors affecting diversity and distribution of plant species in our country. Geography of forest resources in Turkey generally consists of rugged terrains showing significant topographic changes in short distances instead of large and uniform land areas. The terrain characteristics cause changes in aspect and elevation in short distances, so that different site can occur. These sites having different characteristics lead to different stand types with high species diversity. Determination of topographic parameters associated with site characteristics has become easier with geographic information system and remote sensing technology. Using these technologies which allow examining events with broad perspective in forestry studies provides decision support tools to practitioners and increases efficiency.

The aim of the present study is to investigate the spatial distribution of Oak forests in Isparta Regional Forest Directorate (IRFD). The study area is approximately 1.8 million hectares. There are 35 forest subdistricts in 6 forest divisions, 1 arboretum subdistrict and 3 national parks in this area. This region has an altitude of 75–2975 meters.

In this study, digital elevation model produced from space shuttle radar sensing data, briefly known as SRTM (Shuttle Radar Topography Mission), was used. Elevation and aspect classes of the region were acquired with spatial analysis techniques of geographic information system based on the digital elevation model. Distribution of the Oak stands available in the geographic database was investigated according to these topographic parameters. Consequently it was determined that how Oak forests distributed in these elevation and aspect groups in IRFD.

SOIL ARTHROPODS (ARTHROPODA) OF PURE OAK (*QUERCUS*) STANDS ON NORTHERN THRACE -TURKEY*

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In this study, changing of soil arthropods which are active inside and on soil at different pure oak stands in Northern European part of Turkey (Thrace) was investigated. Study was conducted on pure oak stands which are separated as conversion of coppice and including different stand types located in the 5 different regional forest sites including İğneada, Demirköy, Kırklareli, Vize and Çatalca in Northern Thrace. In each site, 3 replicated Ma (mean tree diameter 0-8 cm), Mb (mean tree diameter 9-20 cm) and Mc (mean tree diameter 21-36 cm) stand types and 1 replicated BM (degraded, canopy cover less than 10%). stand type were determined. Thus, total 10 sample areas for each site and 50 sample areas for whole research area were sampled. 4 pitfall traps were set by 25 m intervals in each sample plot to capture arthropods in july-2009. Little antifreeze was added to pitfall traps, and they left on field over 24 hours.

As a result, 3754 individual arthropods belonging to 27 different ordo and family were accounted. The highest diversity was determined in Ma and Mb stands with 27 different families. The highest number of individuals was found in Ma stands as 1079 individuals. Younger stands have more species diversity. However, Shannon Wiener diversity index value (y=0,0359x+0,5127) increase with stand age. The mean number of species in each trap for BM, Ma, Mb and Mc stand types were 3,5±1,5; 3,9±1,6; 3,4±1,5 and 3,5±1,4 respectively. And the mean number of individulas in each trap for BM, Ma, Mb and Mc stand types were determined as 48,8±108,9; 19,6±22,9; 15,3±19,9 and 14,3±16,4 respectively. The most founded individuals were counted as 2666 in Formicidae (Hymenoptera: INSECTA), 400 in Areneae (ARACHNIDA) and 243 in Entomobryidae (Collembola: INSECTA). Demirköy show the highest ordo and family numbers (28) among different 5 local sites. The highest number of arthropods (1672) was counted in Kırklareli forest site.

Keywords: Thrace, oak, arthropods, coppice

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OAK (*QUERCUS*) HEALTH STATUS ON NORTHERN THRACE PURE OAK FORESTS*

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Oak decline became more prevalent since the 1950s. Increased damages in oak stands occurred in several countries and were ascribed as a complex of different diseases caused by biotic and abiotic factors. Oak forests have the second largest area after pine forests and the area of oak forests consist 22.4% of total forest area in Turkey. Similarly, oaks wide spread on Northern Thrace and the area of pure oak forests is 23042 hectares in total 75750 hectares forest area. In addition, oak distributes on 41154 hectares mixing with beech. Oak declines have also been observed in Turkey likely being in the world. The study was carried out on Conversion of Coppice Oak Ecosystems in Demirköy and Kırklareli region (41º 50′ N, 27º 46′ E) in Northern Strandjas during the 2008-2009 summers. In this region, the most dominant *Quercus* species are ((*Quercus petraea* (Mattuschka) Lieb. subsp. *iberica* (Steven ex Bieb.) Krassilin), (*Quercus frainetto* Ten.) and (*Quercus cerris* L. var. cerris)).

We conducted this study to determine the health of individual trees by monitoring the presence of decline symptoms (gall, mistletoe, epicormic growth (sprouting from the main stem and large branches), canopy dieback, foliage death etc.). 6441 oak trees in 236 sample plots were observed and 2308 oak trees recorded with these symptoms. 44% of *Q. petraea*, 34% of *Q. frainetto* and 27% of *Q. cerris* had decline symptoms. The decline symptoms data are also analyzed by parent material stand type, canopy cover, elevation and aspect.

Keywords: Oak species, decline symptoms, stand characteristics, Thrace.
* This work was supported by TUBİTAK project number is TOVAG-107O750.

ABSTRACTS

POSTER PRESENTATIONS

THE EFFECT OF RADICLE PRUNING ON ROOT AND SHOOT MORPHOLOGY IN *QUERCUS VULCANICA* SEEDLINGS

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This study was examined effects of radicles pruned on morphological characteristics of *Quercus vulcanica* seedlings. *Quercus vulcanica* acorns were collected from natural stands in late October 2003, in Yukarı Gökdere province, Isparta, Turkey. The acorns were stored in polyethylene bags at 4 °C for four months and then germinated acorn divided into three radicle pruning treatment groups: i) radicles unpruned (Control: 0.5 cm length of radicle); ii) pruned all of radicles; and iii) radicles pruned back to 1.5 cm. The treated acorns were sown 1–1.5 cm deep in polyethylene containers in late February 2004. In late March 2005, 30 seedlings from each radicle pruning treatment for 1-year-old seedlings were lifted from pots and measured to determine morphological characteristics. Results indicated that radicle pruning increased the root collar diameter, shoot and root dry weight, main root number, the number of first order lateral roots < 1 mm. However there were no significant differences among radicle pruning treatments for height and the root-to-shoot ratio. Though radicle unpruned treatment had a single root, radicle pruned treatments had multiple roots. Both shoot and root growth at radicles pruned back to 1.5 cm treatment better than the other treatments.

Key Words: *Quercus vulcanica*, acorn, radicle pruning, seedling morphological

GROWTH AND DEVELOPMENTS KINDS OF *QUERCUS* L. IN MARDAKAN ARBORETUM AND THEIR USE IN GARDENING

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In article is described an annual growth, development of phases kinds of *Quercus* L. been introducted in Mardakan arboretum. Due to stability to soil climatic conditions Apsheron kinds of *Quercus* L. can be to recommend for use in gardening

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SAMPLING *LUCANUS* SP. (SCOPOLI, 1763) OF THE WEST-PALAEARCTIC

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Because of the rich morphologic variability within *Lucanus* sp. (Scopoli, 1763) the taxonomic status of many species is still discussed. Here we give an overview of the *Lucanus sp.* of the West-Palaearctic including *Pseudolucanus barbarossa* (Fabricius, 1801), *L. cervus* (L., 1758), *L. tetraodon* (Thunberg, 1806), *L. ibericus* (Motschulsky, 1845) and *L. orientalis* (Kraatz, 1860). For *L. tetraodon*, *L. ibericus* and *L. orientalis* respectively 6, 5 and 5 subspecies are accepted. Mainly for *L. cervus* the status of subspecies remains uncertain, subspecies like *akbesianus* (Planet, 1896), *cervus* (L., 1758), *judaicus* (Planet, 1902) and *turcicus* (Sturm, 1843) are suggested. For each species we briefly present the taxonomic status, identification and distribution.

To better understand this complex taxonomy we are aiming to conduct a phylogenetic study on *Lucanus* sp. in the West-Palaearctic. Preliminary results are presented showing a clear differentiation between the *L. tetraodon, P. Barbarossa* and *L. cervus. L. cervus* is however very related to *L. ibericus*. Two currently unidentified *Lucanus* specimen from Turkey suggest the existence of at least two other species. For this research we are looking for more samples especially of *L. ibericus* and *L. orientalis*.

MULTIPLE USAGE OF OAK FORESTS IN RUISSALO ISLAND IN SOUTH-WESTERN FINLAND

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Quercus robur forests in Finland represent the northern limit in its distribution area. Fossil pollen records show that postglacial migration of oak to Finland started approximately 8000 years ago. The migration occurred from both east and west. The current distribution is within the narrow hemiboreal coastal zone in south-western Finland. The largest oak woodlands in the country occur on a 9-square-km island Ruissalo located next to the city of Turku. Oak dominated deciduous forests make up about one third of the forests on the island. Together with the cultivated areas and meadows the oak forests contribute to the rich flora and fauna. There are several species of invertebrates and fungi that either don't exist in other parts of the country or are very rare. Large parts of the oak forests are protected with national conservation and protection programmes and almost the whole island belongs to the European Natura 2000 programme. Ruissalo is the most important recreational area in the region with facilities for e.g. golf, sailing, camping, and swimming. The ownership and responsibility of the management of Ruissalo was transferred from the Finnish state to city of Turku in 2006, which allows a seamless integration of both nature conservation and recreational aspects in the management plans.

THE CAPACITY OF CARBON SINKS IN THE SOILS OF DEHESAS CONTAINING *QUERCUS ILEX* L. SSP. *BALLOTA* (DESF.) SAMP

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The Dehesa are the most characteristic and representative system of farming, forestry and grazing in Mediterranean Spain, covering 1.25 million hectares in Andalusia that corresponds to half of the national total. This use of the land, which integrates forestry, farming and grazing practices, has allowed the conservation of oak trees for years, since the woodland is essential not only for the provision of animal food, but also for the environmental services which it offers such as carbon storage (soil carbon sequestration). This study investigated the capacity to act as carbon sinks that different types of dehesa soils containing a predominance of *Quercus ilex* L. ssp. *ballota* (Desf.) Samp has, analysing their vertical distributions in 108 soil profiles. The soil profiles were undertaken between 2005 and 2007 in the country of Los Pedroches, in the north of the Cordoban Province of Spain. The soils were classified according to profiles key and units geomorphogical and edaphological the Junta de Andalusia (2007). The organic carbon content OC (C g per kg of soil) was calculated using the Walkley-Black method. To calculate the capacity of OC accumulation, the values of the apparent density were used, utilising Santos (1979) multiple regression equation, and the thickness of the horizon. Two representative soil groups were identified in the zone: Cambisoles and Leptosoles. For their macromorphological characteristics, the Cambisoles present three well defined horizons (Ap, Bw, C), with an average horizon thickness of: A= 20, 96 cm. B= 34, 5 cm. C= 46, 63 cm. The Leptosoles present soils of less depth with two horizons (Ap or Ah and B) and with a thickness of: A= 18,5cm, C= 48,27cm. Greater variations in the average values of the horizon apparent densities were not found. The correlations between the soils OC, texture and pH were weak. Similar behaviours exist in the general content of OC in both types of soil in relation to their vertical distribution, in Cambisoles: A = 12, 28; B= 5, 98 y C= 3, 98 t/ha/Horizon and in Leptosoles: A= 13, 54 y C= 10,93 t/ha/Horizon respectively. Nevertheless, in the Leptosoles there could have been a greater capacity of OC storage owing to the fact that they were not as deep and content is greater in lower horizons.

Key words: sinks, organic carbon, oak, dehesa

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SOME NEW MONUMENTAL OAK TREE RECORDS FROM BOLU

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The place is called “Yozgat Cemetary” is located in Bolu province. In this cemetary, very old aged *Quercus robur* trees are dominant. Among them three trees were found to be “dimensional monumental trees” according to their measurements. Their heights and chest height diameters are: 12.00 m, 1. 68 m for the first tree, 16.00 m, and 1.88 m for the second tree and 16.50 m, and 1.30 m for the third tree respectively. The age estimation was not carried out due to increment core samples as they were not safe. However, the tomb in the cemetary was built in 1484. Therefore, we can say that the trees were at least 500 years old. The cemetary is protected from animals but trees need to be cared as they are very old.

Keywords: *Quercus robur*, monumental tree, Yozgat Cemetary, Bolu.

USAGE OF OAK SPECIES IN LANDSCAPE DESIGN

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We can see oaks, which have an important part of Turkey's vegetation, as deciduous or some species like ever green oaks; generally in forms of a few numbers of small tree and long bush. Oaks classifying as white oaks, red oaks, ever green oaks and take place in fagaceae family have 18 species around the world. With its fruits named 'acorn' which is cylindrical formed in chalice shaped bark and different sizes; with lobed edge and rarely oval shaped leaves, oaks often take part in artificial quarters. With physical properties like 25-30 m tall and can reach 2-3m diameter, oaks are used for making emphasis, forming background, surrounding; wing, dust and obscuring noise in groups or as a solitary.

Plant species are valuable in terms of visuality, useful in terms of function, and more effective elements by means of their structural feature. Because of this reason, plantal design criteria carry weight. In general meaning, deciduous oaks with becoming colorful and ever green oaks with the feature of forming background and obscuring are among the plants having significance in landscape. Some kinds of oaks are monumental trees in terms of age and size features that provide a connection between our past and present and monumental trees have a feature of being focal point where they are intensely used.

Samples, in terms of aesthetic and functional usages of oak species in landscape designs, are going to be shown in this study.

Key words: Landscape, Oak, Usage

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SPECTRUM VARIABILITY OF HOLM OAK LEAF IN DEHESA. INFLUENCE OF EDAPHIC FACTORS AND LAND USE

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Quercus ilex L. ssp. *ballota* (Desf.) Samp. (holm oak) is the most important woody species in oak-rangeland ecosystems of SW Spain, called 'dehesa'. Information about canopy biochemistry of holm oak is of great importance, in order to understand nutrient cycling, acorn production and the decline of tree caused by *Phytophthora* disease. Near-infrared reflectance spectroscopy (NIRS) technology has proven to be capable of replacing traditional wet-chemistry laboratory methods for determining nutrient concentrations in dried and ground foliage. However, there are few studies about the applicability of NIRS over fresh oak foliage using portable instruments adapted to field applications.

Based on this background, the main objective of this work was to evaluate the spectrum variability of the fresh leaf of holm oak in order to define leaf sample size when monitoring oak in dehesa, and to elucidate the possible influence of edaphic factors and land use.

The study was carried out in eight dehesa farms located over different nature soils, acid or basic soils, in Andalusian (Spain). In each farm, two types of vegetation structures resulting from different land uses were chosen: grazed dehesa (native grasses + holm oaks) and encroached dehesa (shrub + holm oaks). Ten holm oaks per farm and land use were selected for foliar sampling. Thirty leaves were collected from the middle portion of current-season shoots, located, these shoots, in the south canopy at mid-height. Spectra were collected on all leaves in reflectance mode (Log 1/R) using a handheld microelectro-mechanical system (MEMS) spectrometer (Phazir 2400, Polychromix, Inc., Wilmington, MA, USA). The Phazir 2400 is an integrated near-infrared handheld analyzer that incorporates all the essential components to deliver field applications. The spectrophotometer scans at 8 nm intervals (resolution-pixel 8 nm, resolution-optical 12 nm), across the range 1600–2400 nm. Principal component analysis (PCA) was carried out to investigate relationships between wavelengths. Factor PC1 was used to assess variability among leaves (inside a tree and among trees). ANOVA was performed to compare spectrum variability between land use and soil type.

Results show that the leaf variability among trees is greater than the variability found inside a tree. Spectrum variability showed significant differences between soils, with lower variability in the basic soils. There were not significant differences between land uses. According to these results, it possible to set a standard sampling intensity (number of leaves per tree) based on acid soils, when monitoring oaks in dehesa farms.

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FUNGAL SPECIES ON OAK IN TURKEY

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Oaks are ecologically and economically very important trees in Turkey. There are totally eighteen species of oak and they make up 26 % of the total forest area. Oaks provide a habitat for many species of pathogenic and saprotrophic fungi and therefore play an important role in fungal diversity. The present work is a brief review of fungal species occurring on oak.

Among pathogens the most common species are *Apiognomonia quercina* Roberge ex Desm.) Höhn, *Armillaria mellea* (Vahl) P. Kumm., *Colpoma quercinum* (Pers.) Wallr., *Cryphonectria parasitica* (Murr.) M.E. Barr, *Daedalea quercina* L. Pers., *Fistulina hepatica* Schaeff With., *Fomes pinicola* sensu Llyod Buchanan & Ryvarden, *Ganoderma applanatum* (Pers.) Pat., *G. lucidum* (Curtis) P. Karst, *Hymenochate rubiginosa* (Dicks.)Lev., *Hypoxylon fragiforme* (Pers.) J. Kickx f., *Inonotus dryadeus* (Pers.) Murr., *Microsphaera alphitoides* Griff and Maubl, *Mycosphaerella maculiformis* (Pers.) Schröter, *Sphaerulunia serographus* (Dur and Mont) Sacc., *Panellus stipticus* (Bull. Ex Fries) P. Karst., *Phyllactinia roboris* (Gachet) S. Blumer, *Phytophthora* spp., *Polyporus adustus* (Willd.) ex Fries, *Polyporus hirsutus* Wulf. Ex Fries, *Polyporus lucidus* Leys. Ex Fries, *Polypours sulphureus* Bull.ex Fries., *Rosellinia quercina* Hartig, *Steccherinum ochraceum* (Pers. Ex Fries) Gray, *Stereum hirsutum* (Willd.) Pers., *Taphrina caerulescens* (Desm. Ex Mont)Tul., *Trametes colliculosa* (Pers.) L and N., *Trametes quercina* Lloyd.

INFLUENCE OF SHEEP GRAZING PRESSURE ON PHYSICAL SOIL VARIABLES IN AREAS REFORESTED WITH *QUERCUS* SPP. PRELIMINARY RESULTS

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The Common Agricultural Policy has promoted the afforestation of agricultural land through its agri-environment programme, with the aim of reducing surpluses and improving farms' environmental conditions. Many of the reforested areas had been pasture or arable land which were cultivated in large-scale rotations and which had usually been grazed by livestock. After the reforestation of this land, grazing was prohibited and controlled by tillage the competition between herbaceous vegetation and seedlings. This also served to reduce the chance of forest fires, so common in the Mediterranean region. Once the forest floor has reached a certain height, control of herbaceous vegetation may be undertaken by grazing, thus reducing the maintenance costs of the reforested area and relieving the pressure imposed by grazing on other farm areas. The grazing of this land for the first time in years modifies the properties of the soil, creating new conditions for tree growth. This work has attempted to analyse the physical and chemical modifications that sheep grazing brings about in an area reforested 15 years ago and this article presents the results obtained in several physical properties of the soil and its relation with grazing pressure.

Reforestation was undertaken in 1995 with *Quercus ilex* subsp *ballota* with a plant density of 312 plants per hectare, leaving spaces 8 metres wide between rows of plants. Sheep grazing areas were established using electric fences in these gaps and three sheep stocking loads were considered: 8, 4 and 2 kgPV/m². After grazing, soil bulk density (DA) was evaluated using cylinders of known volume and at depths of 4cm and 8cm, penetration resistance (IC) was recorded with a penetrometer taking readings at every 0.5cm depth, as well as gravimetric moisture content at 4cm and 8cm depth.

In general, the variables studied increased in line with stocking rates, although without statistical significance. In the first 4cm of soil, DA increased with stocking rate (high = 1.429 gr/cc; medium = 1.426gr/cc; low = 1.352gr/cc) but this pattern was not observed at 8cm. Similarly, penetration resistance (IC) increased with stocking rates (high = 1.46 MPa; medium = 1.36 MPa; low = 1.18 MPa) finding fewer differences in IC between stocking rates at a depth of 8cm. In analysing IC at different depths, no differences between treatments were observed although there was a trend showing greater penetration resistance in the first 2.5cm of areas with a high stocking rate. Taking soil moisture at the time of sampling into account, IC values obtained were not high in any instance. Percentage moisture is higher in the surface soil (greater at 4cm than at 8cm), increasing with stocking rate. In those areas where grazing has not occurred for years, such as in reforested areas, sheep grazing increases DA and penetration resistance of

surface soil, retaining a greater quantity of water in this layer. These effects increase with stocking rates.

Keywords: compaction, soil bulk density, soil moisture, sheep grazing pressure

EFFECTS OF A SHORT DURATION REST IN GRAZING ON THE SOIL OF *QUERCUS ILEX* SUBSP. *BALLOTA* PASTURES

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Open parkland or *dehesa* is an agroforestry system characteristic of southern Spain, aimed primarily at livestock use. This system is characterised by the presence of a well-developed herbaceous ground cover, with *Quercus* trees distributed in low density and mixed grazing (multiple livestock species) with the pigs fed by acorns. In recent years there has been an intensification of livestock in some *dehesas* with a significant increase in stocking rates and grazing periods. Studies of the effect of grazing on the soil are scarce and even lower in agroforestry systems like the *dehesa,* despite the importance it can have on the growth of the oak and the establishment of new saplings.

This paper analyses the effect of a short duration rest period (90 days) from grazing upon soil bulk density (DA), moisture (%H), soil penetration resistance (IC) and carbon content (%C). In an area grazed by cattle and pigs, some areas were set aside from grazing during autumn and spring, while the remaining pastures were grazed continuously. The experimental design was randomised blocks using grazing intensity criteria (high, medium and low grazing pressure) with four replications. The DA was evaluated using graduated cylinders of known volume, soil penetration resistance by penetrometer log every 0.5cm to a depth of 8cm (at least 20 readings), %H with TDR and the %C from soil samples from the first 8cm in an elemental analyser. IC is average for all depths. The soil is a Cambisol eutric-sandy loam.

Results show that short duration rest periods from grazing in the autumn significantly reduce the soil's penetration resistance, regardless of the previous state of soil compaction, whilst in spring, despite maintaining a low penetration resistance in all areas after the rest period; the differences were significant only when grazing intensity was low. In areas with higher grazing intensity, IC shows differences between treatments from the first 4cm, whilst with lower grazing intensity, soil penetration resistance is different from the surface. Soil moisture is affected in all areas by a rest period in grazing, with the soil retaining higher water content at the surface in the continuously grazed treatments. There were no significant differences in DA. Percentage C tends to decrease when grazing is suspended during spring without showing significant differences. It may be concluded that short-duration rest periods in grazing do not affect the carbon content of the soil but reduce soil penetration resistance and modify surface moisture content.

Keywords: Grazing, compaction, soil bulk density, carbon.

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SOME ACORN AND SEEDLING CHARACTERS OF *QUERCUS PONTICA* C. KOCH. A RARE PLANT IN TURKEY

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Quercus pontica C. Koch., as a known the most primitive taxon of *Quercus* genus, is a species of oak native to the Caucasus Mountains and northeast Turkey. Particularly, this taxon is distributed Rize, Artvin-Hopa and Çoruh provinances as stands also; it is found Trabzon as individual in Turkey. As to the list of Red Data Book of Turkish Plants prepared with respect to IUCN endangering category, *Q. pontica* is vulnerable category. In Georgia, it is continuing to decline by grazing on the timberline. *Q. pontica* is isolated species taxonomically therefore, very interesting. In addition, this species, deciduous small tree or large shrub, is grown as an ornamental tree due to rich yellow autumn color in Northern Europe.

In this study, it was investigated the acorn (weight, width, length, volume etc.) where was harvested in Borçka-Karagöl provenance (Altitude: 1400 m) and seedling characteristics (seedling height, root collar diameter, some leaves characteristics etc.). As a result, it was determined that, acorn length means 28,23 mm, width 22,58 mm, weight 8,71 gr, volume 6,67 ml, and seedling length 60,38 mm, root collar diameter 2,82 mm, leaves number 5, petiole length 47,33 mm, petiole width diameter 1,52 mm as mean. Morever, it is stated that the correlation of acorn and seedling characters.

Key Words: Rare plant, Turkey, Acorn, Seedling, Vulnerable, Taxon, *Q. pontica*

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CORK OAK DISEASES AT DOÑANA NATIONAL PARK (SW SPAIN)

By P. De Vita[1], P. Callier[1], M.S. Serrano[1], C. Ramo[2], L.V. García[3], C. Aponte[3], A. Trapero[1] and M.E. Sánchez[1*]

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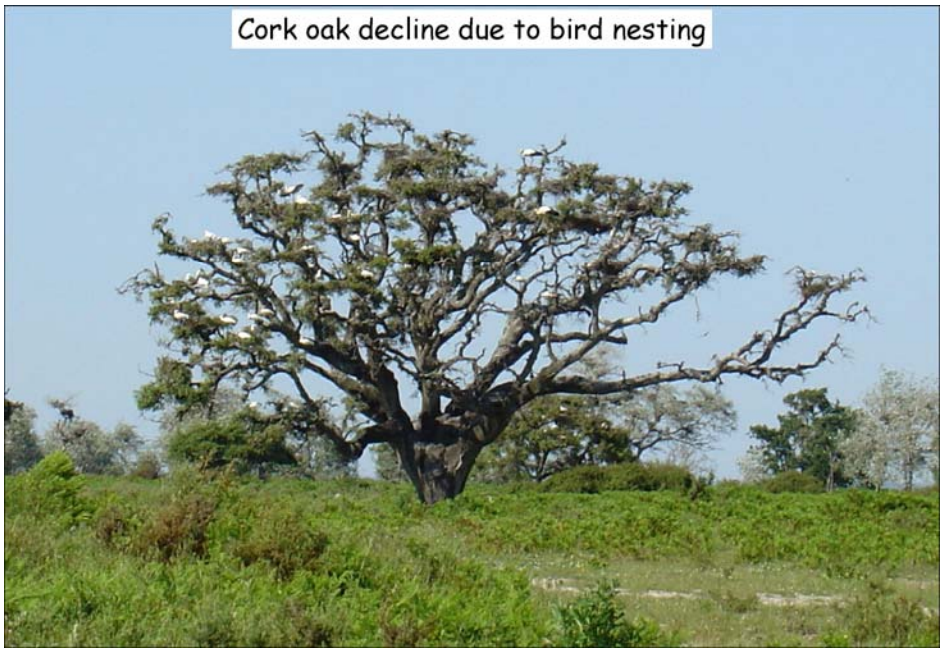
Since early 90's, a severe decline of aged cork oak populations has been observed in the area called "La Vera" at Doñana National Park in southern Spain. At the current rate of mortality, cork oaks are predicted to be extincted in just a few decades. Oak decline seems to include various factors. One of the most evident causes of the decline is the pressure of a big colony of tree-nesting wading birds, as long as the large amounts of bird dejections could modify soil properties and the ecology of their mycoflora. On the other hand, it was confirmed that many of the oaks showing crown sintoms (mainly defoliation) are infected by at less one aggressive soilborne pathogen causing root rot. Probably, the modification of soil composition due to nesting birds has worsening the effect of fungal pathogens in their interaction with oak root systems.

Moreover, branches are also affected by cortical pathogens which promote the death of parts of the crown. Nesting birds also could enhance the incidence of the bark disease, causing wounds on branches that favour fungal infections.

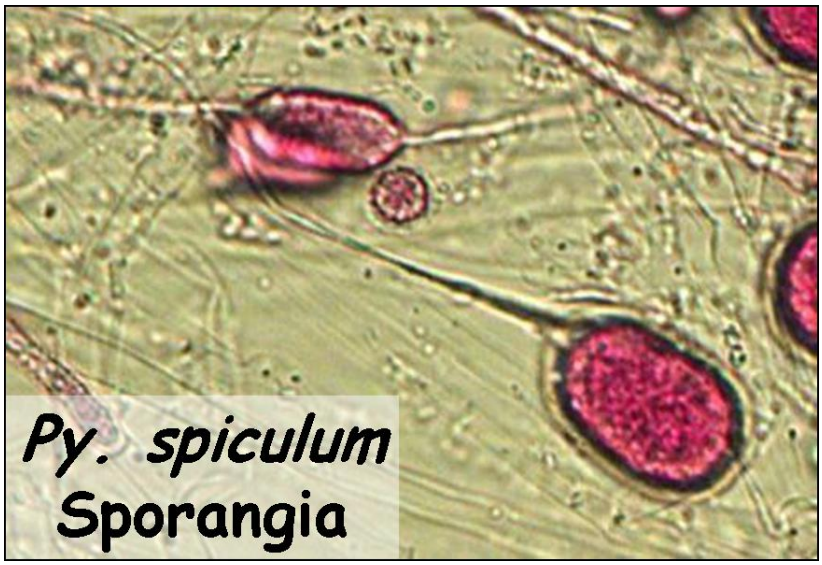
The objective of this work was the diagnosis of the main diseases present in the zone, clarifying their ethiology, incidence and severity. Among the main diseases associated with oak decline, highlights the root rot caused by the soilborne oomycetes *Pythium spiculum* and *Phytophthora cinnamomi*. The main branch disease detected was the cortical canker caused by *Botryosphaeria corticola*. All these pathogens are commonly found in different oak ecosystems in southern Spain and Portugal, causing death of thousands of trees every year.

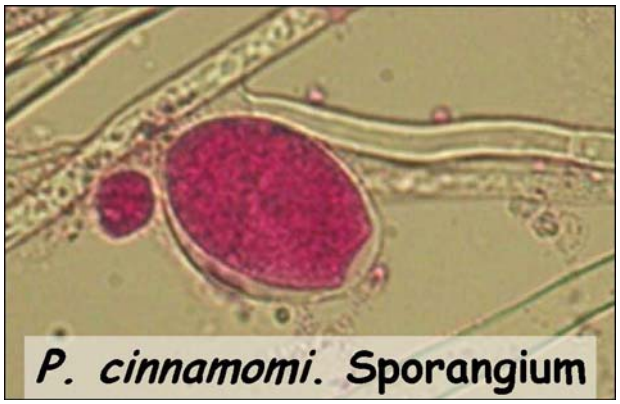
Work financed by the Spanish Ministry of Environment (Red Parques Nacionales). Project "El decaimiento del alcornocal de Doñana en un contexto de cambio global: una aproximación experimental" (DECALDO).

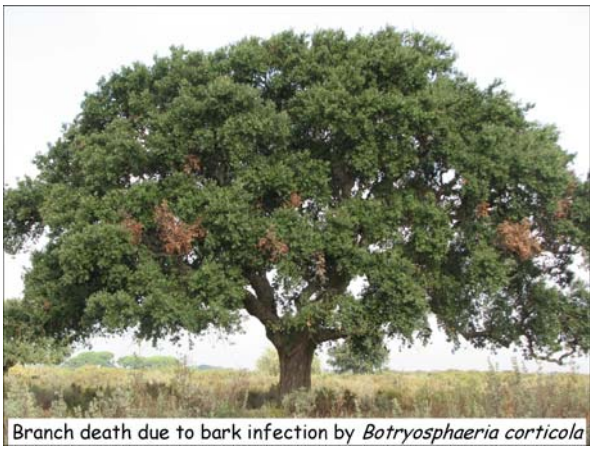

Air view of Doñana National Park (south-western Spain)


Cork oak decline due to bird nesting


Cork oak defoliation due to root infection by *Pythium spiculum*


Py. spiculum
Sporangia


P. cinnamomi. Sporangium


Branch death due to bark infection by *Botryosphaeria corticola*


Crown death due to root infection by *Phytophthora cinnamomi*

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ELATERIDAE (COLEOPTERA) FAUNA OF OAK BIOTOPES OF IDA MOUNTAIN, WESTERN TURKEY

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In this study, some notes on Elateridae (Coleoptera) fauna of oak biotopes of Ida Mountain covering wide area in Balıkesir and Çanakkale provinces of western Turkey were given.

Studies were conducted in the area of Ayı Deresi district of Ida Mountain during the years of 2007-2009. The species of oaks are *Quercus petraea* (Mattuschka), *Q. frainetto* Ten. and *Q. cerris* Linnaeus, and also plants such as *Heracleum platytaenium* Boiss., *Hypericum cerastoides* (Spach) Robson, *Muscari comosum* (L.) Miller, *Valeriana alliariifolia* Adams. occurring in the same biotope. In addition to knock down method; bait trap, pitfall trap and hibernation trap methods were utilized for gathering samples.

In this study, following species were determined: *Drasterius bimaculatus* (Rossi, 1790), *Ischnodes sanguinicollis* (Panzer, 1793), *Athous haemorrhoidalis* (Fabricius, 1801), *Nothodes parvulus* (Panzer, 1799), *Prosternon tessellatum* (Linnaeus, 1758), *Dicronychus cinereus* (Herbst, 1784), *D. rubripes* (Germar, 1824) and *D. senaci* (Desbrochers, 1869).

From these, by using bait traps *D. bimaculatus* and *N. parvulus*; by using pitfall traps *P. tessellatum*; by using hibernation traps *I. sanguinicollis* and *D. rubripes*; by using knock down method, *A. haemorrhoidalis*, *N. parvulus*, *D. cinereus* and *D. senaci* were collected.

From these species, the existence of *I. sanguinicollis* in Balıkesir and the existence of *D. senaci* in Çanakkale has already been reported, other all species were found first time from Ida Mountain in the provinces of Balıkesir and Çanakkale.

Key words: Elateridae, Coleoptera, fauna, oak, Ida Mountain, Turkey.

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OAK DISEASES IN SOUTHERN SPAIN

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Oak-rangeland ecosystems called 'dehesa' take over 780,000 ha in southern Spain. *Quercus* species such as *Q. ilex*, *Q. suber*, *Q. canariensis* or *Q. faginea* grow at dehesas at low density (50-60 trees per ha) allowing grass development for animal grazing.

Since the early 1990's, *Quercus* species are suffering a severe decline leading to high mortality rates of holm and cork oaks in dehesa rangelands and in the forests. Bad management practices, such as the lack of regeneration due to overgrazing or bad pruning have been described as predisposing factors of decline in rangelands. Climatic factors such as long periods of severe drought followed by soil waterlogging are acting as inciting factors and finally, contributing factors such as insect borers, mainly *Cerambyx* spp., and fungal diseases are causing the death of declining trees. The most important disease associated with holm and cork oak decline is the root rot caused by the soilborne pathogens *Phytophthora cinnamomi* and *Pythium spiculum.* Crown symptoms are wilting, defoliation and branch dieback. Root symptoms consisted in a drastic necrosis and death of feeder roots. Fungal cankers diseases caused by *Botryosphaeria* spp. are also killing oak branches. Charcoal canker caused by *Biscogniauxia mediterrranea* and the bacterial canker caused by *Brenneria quercina* have been also involved in oak decline processes in Spain.

On the other hand, there are other diseases affecting oaks in southern Spain which are not associated with decline, as Witches' brooms caused by *Traphrina kruchii* and Scab caused by *Spilocaea quercus-ilicis,* both only affecting holm oak, the Tarry Spot of *Quercus canariensis* caused by *Trabutia quercina*, and leaf spots caused by several Ascomycetes. All these diseases are widely distributed in southern Spain, although they are not very severe. In addition, the trunk canker caused by *Botryosphaeria corticola* is a serious disease of cork oaks which is leading to high looses in cork production.

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NOMADIC PEOPLE OF OAK FORESTS IN TURKEY: YORUKS

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Oak is represented with 18 species in Turkey and has the largest distribution area size. Oak is one of the most important components in Mediterranean vegetation and is being hardly degraded in many ways for a long time. The initial application causing damage is grazing. Especially pure hair goat (*Capra hircus* L.) grazing is very important for this region. Pure hair goat is a component of Mediterranean vegetation likewise oak.

When we talk about oak, Mediterranean region and pure hair goat, we have to add Yoruks to these elements. Yoruks, the nomadic people whose unique source of income is pure hair goat breeding are the last representatives of a disappearing culture. Yoruks make a vertical move during the year depending on the seasons. To support fodder for their livestock they move to upper lands where it is cooler and provides more grass and in winter they move to the forest places nearby the coast where it is low and warm.

So what is the problem? Why Yoruks are seen as a danger for oak forests? Oak is distributed not only in central, east and south east Anatolia's antropogen steppes where cold arid and hard climatic conditions exist but also in Mediterranean region where Mediterranean climate exist and Yoruks live mostly in these areas. They graze their animals in the forest lands. But in some districts oak is subject to rehabilitation and it causes an oversensitivity about this species. Also, the productivity of forests decrease in some districts where pure hair goat breeding is common and also pure hair goat grazing gives harm to afforestration and rehabilitation practices directly or indirectly. In addition to this, grazing prohibitions in forestlands and protected areas prevent grazing. These prohibitions cause Yoruks lose their mainstays so this implementation and some policies force them to choose settled life instead of nomadic life style.

The aim of this study is to introduce Yoruk culture pertaining to our country and to investigate grazing problems created by raising livestock in forests thoroughly in Yoruk culture which is a part of this production system.

Keywords: Breeding, grazing, livestock, oak, pure hair goat, Yoruks,

DECLINE OF RELICT CENTENNIAL CORK OAKS IN DOÑANA (SW SPAIN) AND POTENTIAL DELETERIOUS EFFECT OF TREE-NESTING COLONIAL WATERBIRDS

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Centennial cork oaks (*Quercus suber* L.) are spread in the sandy soils of Doñana (S. W. Spain). They are remnants from the formerly extended oak forests that were overexploited during the XVII-XX centuries. After the protection of the area as Biological Reserve forty years ago, all silvicultural practices such as cutting, pruning and cork extraction ceased. At the same time, seven species of wading birds began to nest on the centennial oaks located in the marsh edge, forming a big colony. We hypothesize that colonial nesting birds are contributing to the observed rapid oak decline.

We analysed a cohort of centennial cork oaks along a gradient of nesting bird influence. In each tree we evaluated the bird isotopic signature ($\delta^{15}N$), crown defoliation status, a proxy for leaf water-use efficiency ($\delta^{13}C$), several key soil variables, and percent of leaf surface covered by faeces. $\delta^{15}N$ values were positively related to increased leaf water-use efficiency and crown defoliation values, suggesting that the heavily occupied trees were under higher water stress and in poorer health condition than the unoccupied ones.

On the other hand, the soil bird isotopic signature was highly correlated to increased soil salinity values which, in turn, were significantly related to increased leaf $\delta^{13}C$ values and to increased crown defoliation status. No relationship was found between declining symptoms and leaf covering by faeces.

We tested structural equations models (SEM) based on different hypothesized bird effects on tree health status. Indirect (soil mediated) effects of the nesting birds best explained the observed tree declining symptoms.

We concluded that the decline of the centennial oaks is related to the cumulative effect of the nesting wading birds. The morphological and isotopic drought stress-like symptoms observed in the declining trees are consistent with the huge increase in the levels of biogenic salts (as nitrates and phosphates) detected beneath the heavily occupied trees.

For the Reserve managers there is a challenging trade-off between preserving the relict large scattered trees, which harbour a high genetic diversity and have a key ecological role in these savannah-like ecosystems, and maintaining the current nesting area for these protected but expanding wading birds.

Key words: $\delta^{15}N$, δ13C, heronry, indirect effects, soil salinity, oak decline, stable isotopes.

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MINOR AND RARE OAK SPECIES IN THE CZECH REPUBLIC

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Introduction

Oak species are considered as the most economically and ecologically standforming broadleaves in the Czech Republic. They are the second most represented genera of broadleaves after beech; the share in the forest tree composition reaches currently 6.8%, while the reconstructed natural proportion exceeded 19%. However, in connection with the implementation of international commitments (Convention on Biological Diversity, documents from Ministerial Conference on the Protection of Forest in Europe) and in accordance with the fulfilment of goals of the state forest policy it is proposed to increase the oak proportion up to 9%. Silvicultural and management systems, lack of natural regeneration, often damages by game, and partly oak-die-back by pathogens were main factors affecting decrease of oaks in tree species composition. Oaks in broadleaves forests are endangered also by other tree species in mixture due to hard competition.

Oak stands cover large area in the lower forest vegetation zones (oak, oak/beech and beech/oak), mostly at altitude up to 550 m, but in suitable site condition oak can raise far above. Two main oak species are naturally distributed in the Czech Republic: pedunculate oak (*Quercus robur* L.) and sessile oak (*Quercus petraea* (Mattuschka) Liebl.). But in total it was found eight native species. The remaining six oak species - pubescent oak (*Quercus pubescens* Willd), Turkey oak (*Quercus cerris* L.), adriatic oak (*Quercus virgiliana* Ten.), dalechamp's oak (*Quercus dalechampii* Ten.), cluster-fruited oak (*Quercus polycarpa* Schur) and Hungarian oak (*Quercus frainetto* Ten.) - occur sparsely only in special site condition in the warmest regions, where they are the component of thermophilous oak forest, because the centre of their more continuous distribution lies in south and south-east Europe. All of them are native also in Turkey. These oak species mostly grow in economically less important forests of forest-steppe character, often on localities important from view point of nature and biodiversity conservation. Some minor and rare species are difficulty determinable, and therefore they were mostly ignored in forestry practice. Determination may be complicated by the spontaneous reciprocal crosses. Due to their genetic and species diversity, a wide ecological amplitude and relative resistance to drought and high temperatures, the importance of these thermophilous oak species can considerably rise in the future due to expected climate change with probable global warming trends.

Taxonomy and Ecology

Pubescent oak (*Quercus pubescens* Willd.) has in the Czech Republic scattered distribution only in the southern Moravia, Bohemian Karst and Bohemian Central Highlands. It occurs mostly individually scattered or in small often scrub stands with low stand density on sunny slopes or on the extreme microlocalities on hills edges, often on

shallow, rocky and drying soils. In south Moravia it also grows on deep soils, such as loess. It prefers the basic geological backgrounds. In comparison to sessile oak it does not grow on extremely acid soils with raw humus. It is characterized by considerable resistance to drought.

Turkey oak (*Quercus cerris* L.) grows on basic and also on acid mineral ground, however, it rather avoids the calcium-rich soils. It reaches northern limit of its distribution area in southern Moravia. Besides south-east Europe it is widespread also in Turkey, but only in the mountains above 1 000 m a. s. l.

Dalechamp's oak (*Quercus dalechampii* Ten.) is more frequent in the calcium-rich substrates. It tolerates very well the drying soil and is very well adapted to continental climate. It is also resistant against frost location. In extreme site conditions it forms open scrub stands. In the Czech Republic it is distibuted in the southern Moravia and probably also in the Bohemian Karst and Bohemian Central Highlands.

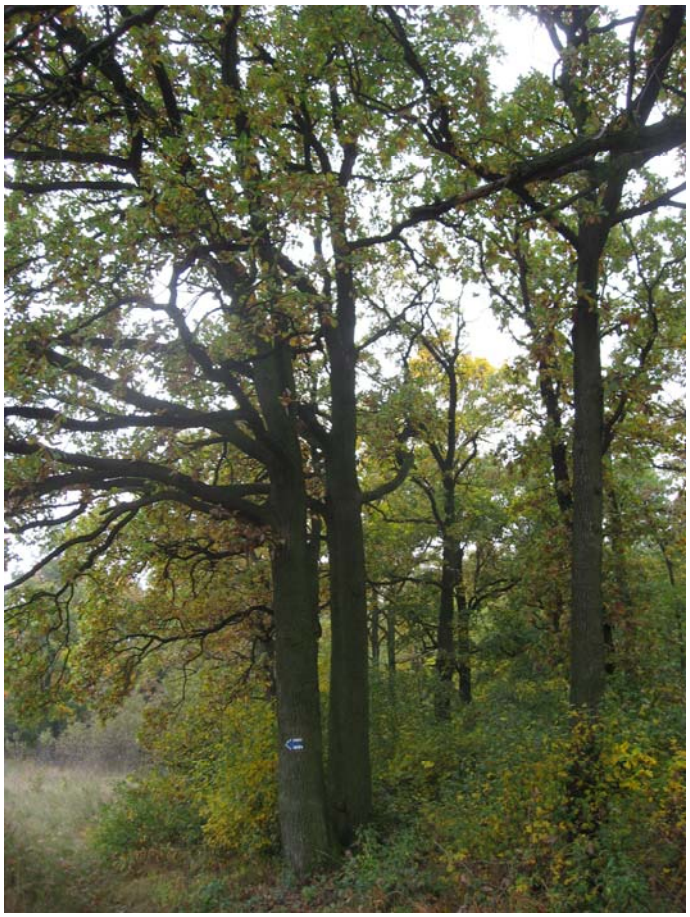
Cluster-fruited oak (*Quercus poly-carpa* Schur) has similar ecological requirements as *Quercus pubescens*. Its distribution area in the Czech Republic is still poorly known and is limited on the warmest regions of the country.

Hungarian oak (*Quercus frainetto* Ten.) tolerates more shade. It grows on sunny dry mineral-rich permeable soil. This species is considered as the rarest oak within the Czech Republic. Only one native locality in southern Moravia is still known.

Adriatic oak (*Quercus virgiliana* Ten.) has similar ecological requirements as *Q. pubescens,* but some types of this oak grow even on more moisture favorable site conditions. It occurs very rare only in southern Moravia.

The main activities in silviculture, management and gene resources conservation of minor and rare oak species:

- improvement of oak species determination
- provenance testing
- studies of ecological requirements of different oak species and populations
- phenological studies, evaluation of fructification
- monitoring of health condition
- possibilities of breeding for resistance to tracheomycosis disease
- field inventory of minor and rare oak species trees and populations and selection of best quality individuals
- selection of clones resistant to oak leaf roller moth (*Tortrix viridana*)
- measures for conservation and reproduction of selected valuable and vulnerable genetic resources
- effort to raise public awareness about minor and rare oak species among foresters



Research projects

Investigation of variability and measures taken for the conservation and reproduction of genetic resources of indigenous oak (*Quercus* spp.) and lime (*Tilia* spp.) species“ (2000 - 2004)

The new oak provenance plots with the proportion of minor and rare native oak species were established to collect and improve knowledge about their distribution, variability and breeding and genetic aspects. The results will be compared with the two main oak species (*Quercus robur* and *Quercus petraea*). Evaluation of these provenance trials will afterwards serve as a source of scientific information about the genetically conditional variability of oak species within the Czech Republic.

Dendrological and ecological analysis of oak species in protected areas of School Forest Enterprise Křtiny (2004 - 2007)

This survey was focused especially on little known species *Q. dalechampii* Ten. and *Q. polycarpa* Schur. The aim was to find out whether significant differences between both species existed and which characteristics could be reliably used for species identification. The second aim was the construction of distribution map of oak species in protected areas of School Forest Enterprise Křtiny and to evaluate various oak species occurrence and growth in different natural habitats.

As conclusion it was found, that *Q. polycarpa* occurs on all site conditions, *Q. dalechampii* was quite common on meso-basic and basic soils in the second forest altitudinal vegetation zone while *Q. petraea* tends to grow on more acid soils where it was abundant. Other species had been found rarely. *Q. pubescens* occurs only on limy soil of the warmest parts of the study area similarly as *Q. virgiliana,* however *Q. virgiliana* grows usually on lightly more mesophyllous sites than *Q. pubescens*. *Q. cerris* occurs on limy soils on semi-dry sites. The new methodology for determination of *Q. dalechampii* and *Q. polycarpa* based on traits on the leaves has been published.

Forest tree breeding and conservation of gene resources of valuable and endangered populations including using of biotechnological procedures, methods of molecular biology and knowledge of seed management in forestry (2004 - 2008)

The phenotypic evaluation in the forest stands with autochthonous oak species has been carried out. Tree height, stem height without crown, breast height diameter, stem and crown health status, stem form, stem transsection and sinuosity, type of branching, ability to sprouting capacity, and thickness of main crown branches were measured and assessed.

Utilization of genetic resources of native species for reproduction of adaptable oak forest ecosystems (2008 – 2012)

This project includes five workpackages. The first one is focused on implementation of intentional intraspecific and interspecific hybridization of native oak species from section *Robur, Roburoides* and *Dascia* and the first results of intraspecific hybridization of pedunculate oak, and verification of the possibility of acceleration of the flowering induction of grafted plants. Other workpackages concern the health condition monitoring of oak saplings. The influence of mycorrhiza and other fungi and insects harmful factors to health condition is evaluated on five oak provenance plots at the age of 25 years. The occurrence of *Phytophthora* sp. is monitored. The last workpackage is aimed at assessment of the status and reproduction possibilities of selected thermophilous oak stands in the Bohemian Karst and Bohemian Central Highlands. Up to now the selection of suitable stands and group of trees of rare termophilous oak species, measurement and phenotypic evaluation and survey fructification and natural regeneration in relation to the competition of other species have been realized.

Stabilization of forest functions in anthropically disturbed and changing environmental conditions (2009 - 2010)

Within the project the searching for minor and rare oak species continued, including their determination and evaluation. The data about distribution and phenotypic variability of minor oak species in relation to habitat were processed. The most

valuable selected clones were vegetatively propagated by grafting and stored in the clonal archive.

Conclusion

The paper deals with information about occurrence of several minor and rare oak species in the Czech Republic. Their distribution, characteristics, research activities and measures taken in the last years for management and gene resources conservation are described including selection of suitable stands and groups of trees, measurement and phenotypic evaluation and survey of fructification and natural regeneration.

Acknowledgement

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CYNIPID GALLS (HYMENOPTERA: CYNIPIDAE) ON *QUERCUS VULCANICA* IN SULTAN AND TURKMEN MOUNTAINS

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In this study, 10 cynipid species were recorded on *Quercus vulcanica* in Sultan and Türkmen Mountains in 2008 and 2009. These species are *Andricus caputmedusae*, *Andricus coriarius*, *Andricus curvator*, *Andricus foecundatrix*, *Andricus quercustozae*, *Andricus stefanii*, *Cynips quercusfolii*, *Neuroterus albipes*, *Neuroterus anthracinus* and *Neuroterus quercusbaccarum*. *Quercus vulcanica* is new host record for these species.

Key words: Cynipidae, new host, *Quercus vulcanica*, Sultan and Türkmen Mountains.

MICROMORPHOLOGICAL CHARACTERIZATION OF SOME TURKISH OAK (*QUERCUS* L.) TAXA BY SCANNING ELECTRON MICROSCOPE

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Micromorphological features such as trichomes and wax characteristics are useful in oak taxonomy particularly at species and sectional levels. In this study, the abaxial lamina surfaces of some Turkish oak taxa were investigated by scanning electron microscope (SEM). The main purposes of this study were differentiate species or subspecies based on micromorphological traits and characterize micromorphological features of these taxonomic entities. Trichome types were found to be consistent with the results of previous studies for at least well differentiated species, but wax characteristics seem much variable at species level. Although validity of species or subspecies were tested and supported for several groups in this study, close affinity was found between some doubtful species such as *Q. infectoria* subsp. *boissieri* - *Q. pubescens* complex. Putative hybrids of well-defined species such as *Q.macranthera* subsp. *syspirensis* were easily recognized by micromorphological investigations.

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NEW BEETLE SPECIES FOUND ON OLD OAKS IN SOUTHERN TURKEY

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Old oaks (*Quercus* pp) and its beetle fauna are very rare and threatened all over Europe and Turkey. The reason is lack of suitable trees from unfavourable management or habitat conversion. The aim with the study is to describe the diversity and compare the similarity of this fauna in different areas with old oaks in Turkey. But also study the species richness on oaks that regularly get their branches cut from old traditions (pollards/coppice). In this project the same methods have been used for sampling the beetles: window traps on the tree trunk and pit fall traps in the trunk cavities. Eight stands with old hollow oaks, spread on four areas, have been studied in Turkey during 2005-2009. The saproxylic beetles were caught on 10 trees per stand in one season. So far only 12 saproxylic beetle families are fully determined, but many interesting species have been found. Many of the beetle species were found for the first time in the country and so far 25 species are identified as new to science. From the beetle family Elateridae (click beetles) we have found 14 species. In the new material there are two *Cardiophorus*, three *Agriotes*, two *Elathous*, *Megathous*, *Elater* and *Ampedus*. But also several Tenebrionids like two *Allecula* and three *Mycetochara*. Many of the found species are probably depending of the old oaks for larval development, so it would be detrimental to cut the trees and to converse these habitats to forest plantations. The result shows the unique species richness of Turkish oaks and the high endemism among the beetle fauna in Turkey. The conservation value of these habitats are higher than most of similar areas in Europe.

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WHAT CHARACTERISTICS OF OAKS ARE IMPORTANT FOR FORAGING MIDDLE SPOTTED WOODPECKER IN COPPICE LANDSCAPES IN SOUTHERN TURKEY?

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The middle spotted woodpecker (*Dendrocopos medius*) has declined in its distribution range all over Europe. In Sweden *D. medius* was extinct 1984. The decline is mainly because of habitat destruction from intensive forestry or sanitary logging. The woodpecker depends on insects and other arthropods as food resource which it hunts upon rough barked trees.

Old oaks are an important habitat for the *D. medius* but this habitat and its fauna are very rare and threatened all over Europe and Turkey. The study site is situated 50km NE from Gülnar in Mersin district in southern Turkey and is a part of an area larger area consisting of 4 km^2 of old pollard oaks (*Quercus* spp) in a coppice landscape

The aim with the study was to identify important characteristics of trees used for foraging by the middle spotted woodpecker. Every tree visited by foraging middle spotted woodpecker was registered and described. Comparison of the characteristics was made between the visited trees and two sets of control trees.

In the studied area six different woodpecker species was found. Two of the species are very rare and threatened in a European perspective. At the study site in Gülnar 6-8 couples of *D. medius* were living in an area of 100 ha.

The results give indications that trees chosen for foraging by middle spotted woodpecker had:

- Larger circumference
- Taller height
- Deeper bark fissures
- Larger distances to neighbouring trees
- A higher proportion of stems at breast height

In the literature the needed population size for long time survival for *D. medius* is 250 couples. In this Turkish oak-habitat 2500-6500 ha would be a proper size of a set aside object aiming to preserve these birds. For a long time survival of the woodpecker and wood living beetle fauna we suggest that a couple of areas of 3000 ha with old hollow oaks are set aside in different regions of Turkey and one of these could be in Gülnar district in the province of Mersin. We think that the old tradition with pollarding (regularly cutting the branches) of the trees by local shepherds is not harmful to the fauna, but taking out old hollow trees as fire wood needs to be regulated.

RICH AND UNIQUE BEETLE FAUNA FOUND ON POLLARDED (COPPICE) OAKS (*QUERCUS* SPP.) IN SOUTHERN TURKEY

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Old oaks (*Quercus* ppp) and its beetle fauna are very rare and threatened all over Europe and Turkey. The reason is lack of suitable trees from lack of right management or habitat conversion. The aim with the study is to compare the diversity and similarity of this fauna in different areas with old oaks in Turkey, but also study the species richness on oaks that regularly get their branches cut from old tradition (pollards/coppice). This management method of the trees is a very old tradition all over the world to get fodder for the animals and fire wood for the winter. In this project the same methods have been used for sampling the beetles: window traps on the tree trunk and pit fall traps in the trunk cavities. Eight stands with old hollow oaks, spread on four areas, have been studied in Turkey during 2005-2009. The saproxylic beetles were caught on 10 trees per stand in one season. In this preliminary presentation only 12 saproxylic beetle families were included.

Many of the beetle species found in this study were found for the first time in the country and so far 25 species were identified as new to science. Of the species found in Turkey, there are 10 species that are very rare and threatened in Europe and are on the European Red List. The most species rich trees in the study were pollarded oaks (trees with regularly cut branches) near Gülnar, Mersin region in Turkey.

Ten of the species found on old oaks in Gülnar are new to science and six species are very rare and threatened and are on the European red list: the click beetles (Elateridae) *Adelocera pygmaea* (Baudi), *Ischnodes sanguinicollis* (Panzer), *Ectamenogonus montandoni* (Buyss.), *Megapenthes lugens* (Redtenbacher), *Elater ferrugineus* (L.) and the cerambycid beetle *Cerambyx cerdo* (L.), stressing the high protection value of the habitat and the old pollarded oaks in the region. The studied site has many thousands of pollards in an area of four square kilometer size. Unfortunately many of the trees have been cut away and the coniferous tree *Cedrus libanii* is planted instead.

HOW SIMILAR IS THE SAPROXYLIC BEETLE FAUNA ON OLD LIVING OAKS AND DEAD LAYING OAK (*QUERCUS ROBUR*) LOGS IN SWEDEN?

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The fauna living on old trees and dead wood is today threatened all over Europe and in neighbouring countries. The reason is lack of suitable trees and logs from lack of right management or due to habitat conversion from intense forestry. The saproxylic beetle fauna on old oaks (*Quercus* spp) in Sweden are known to be very rich but less is known about the beetle fauna living on oak logs. In Sweden there are still some areas with larger number of old oaks, but the number of oak logs are often very rare in these areas. One can suspect that this fauna is even more threatened than the fauna on old hollow living oaks. The aim with the study is to describe the fauna living on oak logs and compare the diversity and similarity of this fauna on hollow oaks. In this study we will study the species composition of beetles on the logs in different age stages in southern Sweden during the season 2010. We will use window traps to collect the beetle material from 40 large diameter oak logs (>30 cm in diameter). A problem for the traps is the grazing animals in these areas so the traps have to be fenced. We have a beetle material collected with the same type of traps on old hollow oaks in the same study areas to compare with.

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THE BEETLE FAUNA ON OLD OAKS (*Quercus* spp) IN A CEMETARY IN ADANA REGION, SOUTH TURKEY

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Old oaks (*Quercus* spp) in Europe are known to have a very rich saproxylic beetle fauna. The conditions in Turkey are not so well known but recent studies indicate that the oaks in Turkey have an even richer fauna. This fauna is today threatened all over Europe and in Turkey. Often lack of right management or habitat conversion is the reason. In this study window traps were used to study the saproxylic beetle fauna on 13 old oaks in a cemetery (grave yard) north of Adana in southern Turkey in 2009. The aim with the study is to describe the fauna of old oaks in the area and compare with similar studies in Turkey. Preliminary results from the on going analysis are presented. In this preliminary presentation only 14 saproxylic beetle families were included. The comparisons with other studied sites in Turkey show a lower diversity of the studied trees in this study but also differences in species composition i.e. some other species not found in the other studied areas. Partly this can be due differences in management of the traps and sorting technique. One of the species, *Mycetochara* sp, found in this study is new to science and three species are very rare and threatened and are on the European red list: the scarabid beetle *Protaetia mirifica* (Mulsant), the elaterid beetle *Ectamenogonus montandoni* (Buyss.) and the cerambycid beetle *Cerambyx dux* (Falderman). This result stresses the high protection value of the habitat and the old oaks in the region.

THE RANGE OF BOZ PIRNAL OAK (*QERCUS AUCHERI* JAUB.&SPACH.) IN TURKEY AND IT'S USING IN SILVOPASTORAL SYSTEMS

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Quercus aucheri Jaub&Spach is deciduous and an endemic oak species distributing on the Aegean region of Turkey. It has shrub or bush formation which can reach 10m length with drooping branches. However, its geographic range is quite restricted. Although it is one of the major species at the zones where Mediterranean climate is dominate which constitutes maquis formation of the southern Aegean region, it is disappeared at the central Aegean region.

Silvopastoral systems are combination of pastures and/or animal and trees. Therefore, the pressure of villagers over forests is decreased; in addition, the ecological and economic value of forests is protected. The areas where *Quercus aucheri* Jaub&Spach is located have been generally using for grazing. For that reason this species should be used in silvopastoral systems.

In this study, the features and the availability of this species in silvopastoral systems has been determined and presented.

ALLOMETRIC EQUATIONS FOR ESTIMATING THE BIOMASS OF THE MOST ABUNDANT WOODY SPECIES IN A FOREST OF *QUERCUS ILEX* L. PRADES (CATALONIA, SPAIN)

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This paper presents the allometric equations obtained to estimate the biomass of different fractions of the species most abundant in the oak forest of Prades from their diameters. This forest is located in Catalonia (Spain), NE of the Iberian Peninsula. The predominant tree specie is *Quercus ilex* L. that representing 75% of stems, followed by *Arbutus unedo* L. (15%) and *Phillyrea latifolia* L. (5%). The method used has been the dimensional analysis using 20, 10 and 9 stems of *Quercus ilex* L., *Arbutus unedo* L. and *Phillyrea latifolia* L. respectively. Individuals were selected in proportion to the diameter distribution in the area, measured at a height of 50 cm. (D50). To *Quercus ilex* the range of sampled diameters were between 2.0 and 15.3 cm., *Arbutus unedo* between 2.4 and 10.3 cm. and *Phillyrea latifolia* between 2.1 and 7.5 cm. In each tree: leaves, twigs less than 1 cm., wood and bark of branches with a diameter between 1 and 5 cm., wood and bark of branches with diameters between 5 and 10 cm. and wood and bark of branches with a diameter greater than 10 cm. was been separated. The regression equations show a high degree of significance in all cases.

VARIATION IN THE AMOUNT OF LITTERFALL IN TWO *Q. ILEX* L. STANDS GROWING UNDER DIFFERENT CLIMATE.

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This research estimates litterfall dynamics in two evergreen *Quercus ilex* L. oak forests in the Mediterranean Coast of Spain. The two localities (Tarragona and Alicante) have different annual rainfall (647 mm the Northern and 548 mm the Southern station) and in each there are plots at different altitudes which show contrasted forest structure. Litterfall was collected every two weeks during the period of maximum fall of *Quercus ilex* leaves (April to July) and monthly the rest of the year. Data of one year with 3-4 snowstorms allowed us the following: (1) To describe seasonal variations in litterfall fractions (leaf litter, twigs, fruits, flowers and residual litter of *Q.i.*) (2) Search for phenological pattern of litterfall. (3) Discuss about phenological or environmental factors in the litterfall pattern. (4) Establish differences in the amounts of litterfall according to rainfall. The results available so far show high variability (2,2 and 6,7 $g.m^{-2}$ $.Day^{-1}$). The results available so far show high variability (2.2 and 6.7 gm-2. Day-1) in the maximum rates of litter in different places of the North station. These differences are related to the height, density and basal area of forest in each sampling site. A new annual series of these results, we will know if the behavior patterns of litterfall were modified from those measured in the 80 (1982-1989) and 90 (1991-1993) in the stations of Tarragona and Alicante respectively.

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THE BEETLE FAUNA ON OLD OAKS (*QUERCUS* SPP.) IN KASNAK FOREST EAST OF ISPARTA IN TURKEY

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In Europe and Turkey old oaks (*Quercus* ppp) and its beetle fauna are very rare and threatened. The reason is lack of suitable trees from lack of right management or habitat conversion. The aim with this study is to compare the diversity and similarity of this fauna in different areas with old oaks in Turkey, but also to compare with similar habitats in other countries. Eight stands with old hollow oaks, spread on four areas, have been studied in Turkey during 2005-2009. The same methods have been used for sampling the beetles: window traps on the tree trunk and pit fall traps in the trunk cavities. In the study area in Kasnak oak nature reserve the traps were mounted on *Quercus cerris* and *Q. infectoria* at lover altitude (1100-1200m) and *Q. libanii* and *Q. vulcanica* at higher altitudes 1300-1500m during the season 2007. The saproxylic beetles were caught on 20 trees in and around Kasnak oak forest.

In this preliminary presentation only 12 saproxylic beetle families were included. Many of the beetle species recorded were found for the first time in Turkey and so far 10 species were identified as new to science from Kasnak oak forests. Of the species found in Turkey, there are seven species that are very rare and threatened in Europe and are on the European Red List: the click beetles (Elateridae) *Adelocera pygmaea* (Baudi), *Ischnodes sanguinicollis* (Panzer), *Ectamenogonus montandoni* (Buyss.), *Megapenthes lugens* (Redtenbacher), *Elater ferrugineus* (L.), *Reitterelater dubius* (Platia & Cate) the scarabid beetle *Protaetia mirifica* (Mulsant) and the cerambycid beetle *Cerambyx cerdo* (L.). The result stresses the high protection value of the oak habitat and the old oaks in the region. The studied site has many old trees, but it would be of great interest for the total diversity to expand the reserve to also include the stands of *Q. cerris* and *Q. infectoria* at lower altitude.

OLD OAK FORESTS AS KEY HABITAT FOR ENDANGERED WOODPECKERS

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Few bird species in Europe are said to be so closely linked to a specific habitat type as the middle spotted woodpecker *Dendrocopos medius*. The occurrence of this species appears to depend on the presence of old oak *Quercus* sp. forests. The close association to old oak forests has emerged from various detailed studies on the ecology of this woodpecker species. In my talk, I will review the ecological niche of the middle spotted woodpecker in terms of habitat selection, foraging behaviour, diet, nesting behaviour, reproduction and spatial ecology and try to pinpoint the mechanisms underlying the preference for oak forests. At the same time, threats to the persistence of middle spotted woodpecker populations will be discussed. Finally, I will point out gaps in our knowledge on the species' ecology, which may hamper the successful conservation of this threatened woodpecker species listed in the Annex I of the Birds' directive of the European Union.

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ANALYSIS OF CLIMATE-INDUCED INCREMENT VARIATION IN QUERCUS PETRAEA

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Sessile oak (*Quercus petraea* [Matt.] Liebl.) has long played an important role for forestry in Central Europe. Currently, vitality and growth of oak forests in the temperate continental East German lowlands face increasing risks related to climate change impacts. Forests will have to adapt not only to changes in mean climate variables but also to increased variability with higher frequencies of extreme weather events such as prolonged drought periods. As a consequence of these scenarios and of recent oak decline, several research activities have been initiated in Northeast Germany during the past 15 years which focus on the relations between climate variables, vitality indicators, and growth performance of oak in pure and mixed stands. The poster gives an overview of the methodology and major results of analyses carried out to improve the understanding of the climate-increment relationships for sessile oak. Long-term increment data series were derived from a set of sample plots in mixed stands of *Quercus petraea* and *Pinus sylvestris* L. in the state of Brandenburg and in Poland. Based on these measurements and on regionalized weather data for the years 1950-2006, the investigations yielded outputs on several scales:

(1) Annual data of oak increment in diameter at breast height (dbh) were compared for 17 sample plots in Brandenburg to identify years of parallel growth reactions (positive or negative) as visible in de-trended, indexed time series of tree-ring width (TRW). Results indicate a relatively high level of correlation between geographically separate oak stands (fig. 1).

(2) The differences in pointer years between oaks and pines, the low level of "Gleichläufigkeit" (parallelism) of growth-rate time series, and the long-term co-existence of both species in direct neighbourhood indicate that they draw on the resources of their common site in a complementary way.

(3) The software "Dendroclim2002" (Biondi and Waikul, 2004) was applied to carry out principal component analyses of the relation between monthly climate data and tree-ring width within moving windows of 18 years. On this scale, increasing correlation coefficients between climate variables and TRW demonstrate the rising importance of favourable weather conditions in certain months for tree growth (fig. 2).

(4) As a last step, climate-increment-relationships were analyzed on the basis of daily climate data using the program "CLIMTREG" (Beck, 2006). This tool allows the exact identification of periods within the past and current year that were of significant influence on TRW. It is also possible to estimate the impact of changes in temperature and precipitation during these periods on growth rates and on the resulting development of diameter at breast height (dbh).

Beck, W. 2006: Finding best regression approach for description of climate-growth relationships by floating time spans of varying widths. In: Haneca, K. et al. 2006: TRACE - Tree Rings in Archaeology, Climatology and Ecology. Vol. 5: Proceedings of the Dendrosymposium April 20th-22nd 2006, Tervuren, Belgium.

Biondi, F.; Waikul, K. 2004: DENDROCLIM2002: A C++ program for statistical calibration of climate signals in tree-ring chronologies. Computers & Geosciences 30: 303-311.

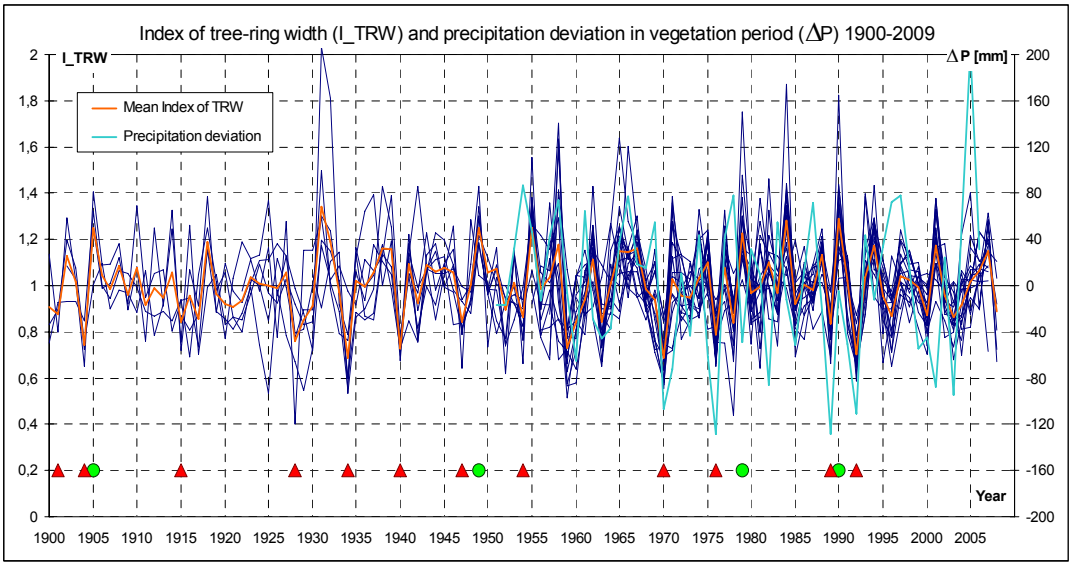

Fig. 1. Analysis of "pointer years" for oak from 17 sample plots in Brandenburg reveals constant frequencies of parallel tree-ring width (TRW) reactions to external influences (tele-connections). Lines represent curves of plot-specific growth rate ("index of TRW") as derived from a sample of 10-15 dominant oaks per plot. Green circles indicate years with 100 % parallelism in positive deviation from trend, red triangles indicate 100 % parallelism in negative deviation. Precipitation during vegetation period May-September is plotted as deviation from 1961-1990 mean.

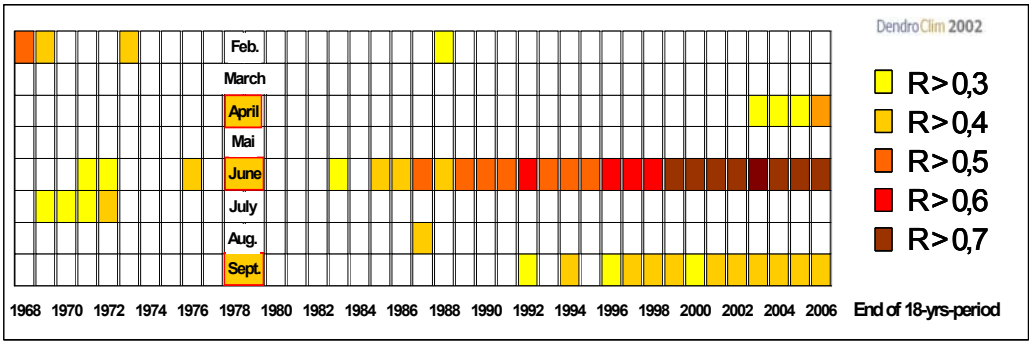

Fig. 2: Increasing importance of precipitation for oak tree-ring width (TRW) as visible in correlation coefficients (R) of TRW with monthly precipitation sums. TRW data come from 20 dominant oaks in a mixed *Quercus petraea-Pinus sylvestris* stand at the age of 140 years in western Brandenburg, Germany. R values are calculated for floating means in windows of 18 years, the column "1968" thus represents the mean R between the months February-September and TRW in the years 1951-1968, the column "2006" represents 1989-2006. Calculations carried out using the "DendroCLIM2002"-software developed by Biondi and Waikul (2004).