Bibliography, GREECE **Dimitrios Trakolis**

Historical perspectives and milestones in the research on natural forests

Dafis S. (1976): Classification of forest vegetation of Greece
Ministry of Agriculture, General Directorate of Forests, publication No 36. [Ταξινόμηση της δασικής βλαστήσεως της Ελλάδος. Υπ. Γεωργίας - Γεν. Δ/νση Δασών, Αρ. 36, σελ. 3-12.]
Abstract: The vegetation zones of Greece are described and classified according to the Braun - Blanquet phyto-sociological system. Five (5) zones have been distinguished, based on ecological, morphological, vegetation and historical factors. The limits of the zones in many cases are interlinked and not clear. The zones are the following: (a) Good - mediterranean vegetation zone (*Quercetalia ilicis*, including coastal, hilly and sub-mountainous areas). (b) Para-mediterranean vegetation zone (*Quercetalia pubescentis*, hilly, sub-mountainous). (c) Vegetation zone of beech, beech-fir and para-mediterranean conifers (*Fagetalia*, mountainous - subalpine). (d) Zone of cold resistant conifers (*Vaccinio - Picetalia*, mountainous, subalpine). (e) High mountains zone above timber line (*Astragalo - Acantholimo*-netalia).
Key-words: Vegetation zones, sub-types, succession

Debazac E., Mavrommatis G. (1971): The great ecological divisions of forest vegetation in mainland Greece. Forest Research Institute of Athens, special issue, bull. No 48. [Αι μεγάλαι οικολογικαί διαιρέσεις της δασικής βλαστήσεως εις την ηπειρωτικήν Ελλάδα. Υπουργείο Γεωργίας, Γενική Δ/νση Δασών, Ινστιτούτο Δασικών Ερευνών Αθηνών, No 48, 33 σελίδες.]
Abstract: The principal ecological divisions of the forest vegetation in mainland Greece have been studied to provide basic data for a forest development plan. They have been defined by using the dominant forest species. They cover a wide ecological gradient. With regards to zonal vegetation, this may be related to three biotopes: Mediterranean, deciduous oak, and mountainous. Specialised vegetation (riparian forests), have also been described.
Key-words: Ecology, forest vegetation zones, succession

Karteris M., Pirovetsi M. (1986): Land Cover/Use Analysis of Prespa National Park, Greece. Environmental Conservation 13/4, 319-324
Abstract: Aerial photographs have proved to be an efficient tool in providing reliable, low-cost, classification data on land cover/use of Prespa National Park. Display of these data, in the form of a map, will permit resource managers and planners to acquire basic information that is necessary for analysing and understanding environmental problems and developing management plans. The procedure involved the development of a classification system, transferring the interpreted data onto a base-map, field-checking the results, and tabulating the area measurements with the pertinent errors.
Key-words: National Park, succession, conservation, aerial photographs

Mavrommatis G. (1973): The ecology of the area of the palm forest "Vai" in Sitia, Crete.
To Dasos. vol. 59-60. [Οικολογία της περιοχής φοινικοδάσους Βάϊ Σητείας Κρήτης. Περιοδικό "Το Δάσος". No. 59-60.]
Abstract: The ecological units of a natural palm forest (Phoenix theophrastii Greuter), located in the area of Sitia, Crete, are distinguished and studied, and the strict protection of the area from development is suggested, because of the importance and value of the forest as a unique natural monument, since it is the only natural forest of its kind in Europe and the only of the specific species in the world.
Key-words: Forest history, ecology, succession, conservation

Mavrommatis G. (1979): The biotopes of *Abies cephalonica*
To Dasos. vol. 86. [Ο αυξητικός χώρος της Κεφαλληνιακής Ελάτης. Περιοδικό "Το Δάσος". No. 86.]
Abstract: The biotopes of *Abies cephalonica* and the areas of its expansion in central and southern Greece are described. The species is found between the higher semi-storey of the goods-mediterranean level of *Quercus ilex* (*Quercion ilicis*), and the super-mediterranean level of *Quercus pubescens* (*Qurcetalia pubescentis*). The optimum vegetation zone of this fir species is that of *Quercus pubescens* , and it is wrong to include *Abietum cephalonicae* in the vegetation zone of beech (*Fagetalia*).
Key-words: Forest structure, Greek fir, biotopes

Moulopoulos Ch. (1965): The beech forests of Greece
Scientific Annals of the Faculty of Agriculture and Forestry, University of Thessaloniki. [Τα δάση της οξυάς της Ελλάδος. Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Επετηρίς της Γεωπονικής και Δασολογικής Σχολής, 88 σελίδες.]
Abstract: The beech species, composing the pure or mixed beech forests in Greece, are *Fagus orientalis*, *Fagus moesiaca* (with two forms, forma spatulolepis and f. taeniolepis), and *Fagus silvatica*. Horizontally, *Fagus orientalis* is distributed mainly in the forests of the eastern regions of the country and to a smaller extent in the forests of the central regions. *Fagus silvatica* is spread mainly in the forests of central and western territories. *Fagus moesiaca*, with its two forms, occurs almost in all beech forests in Greece. Vertically, *Fagus orientalis* occurs on the lower regions, descending down to 180 m above sea level, and ascending often up to 1000 m, and only rarely to higher elevations. *Fagus moesiaca* forma spatulolepis, occurs with *Fagus orientalis* and even on higher elevations, going up to about 1300 m. *Fagus moesiaca* f. *taeniolepis*, grows with f. *spatulolepis* going even higher. Fagus silvatica occupies the highest and coldest regions, descending down to about 1000 m, and only rarely to lower elevations, depending on the concrete ecological conditions (south aspect).
Key-words: Beech forests, distribution, structure, species

Smiris P. (1985): The structure of the virgin forest of Paranesti. Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, vol. 28. [Η δομή του παρθένου δάσους του Παρανεστίου. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, Τόμος ΚΗ, Θεσσαλονίκη 1985.]
Abstract: The structure and species composition at the Climax phase of the virgin forest of Paranesti, at the Greek - Bulgarian border, is studied and permanent experimental plots have been established for future investigations. The forest is a Natural Monument (Strict Nature Reserve) and expands between 1500 m and 1950 m above sea level. It is composed of *Fagus* sp., *Abies borisii - regis* and *Picea excelsa* species, and it is an uneven aged forest with small even aged or large uneven aged groups. The number of trees ranges from 586 to 1071/ha, depending on the development phase and site conditions. The stands have many storeys, and the mean height of all species of the over-storey is 28 - 32 m, that of beech 27- 30 m, of fir 32 -35 m and of *Picea excelsa* 30-34 m. The natural regeneration takes place in small areas of 100 - 300 m^2 and the number of seedlings amounts to 4 - 8/m^2, with beech seedlings prevailing. Other factors, such as mixture of species, distribution in diameter classes, length of crown and vitality of species have also been studied.
Key-words: Structure, stand characteristics, conservation

Smiris P., Zagas Th., Tsitsoni Th. (1989): Structure analysis of a natural forest of Pinus leucodermis on mount Orvilos
Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, 32 (2).[Ανάλυση δομής σε φυσικό δάσος της Pinus leucodermis στον Όρβηλο. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, Τόμος ΛΒ/2.]
Abstract: The structure of a natural forest of *Pinus leucodermis* near the Greek - Bulgarian border is analysed and the main results are as follows: At the stage of the young stand the number of trees is 7,200/ha, the mean BHD 8.06 cm and the mean height 8.43 m. At the optimal stage the number of trees is 3,775/ha and the mean height 11.92 m. At the old - trees stage the number of trees is 500/ha, the mean DBH 40.45 cm and the mean height 25.92 m. Finally at the regeneration stage, the number of trees is 364/ha, the mean DBH 38.03 cm and mean height 20,17 m. The natural regeneration takes place in small groups, under the canopy of the old stands.
Key-words: Natural forest, structure, stand variables

Successional development, disturbances

Athanasiadis N., Gerasimidis A. (1985): Forest ecosystem of Strofilia, NW Peloponese, and its plant-sociological units. Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, vol. 28. [Δασικό Οικοσύστημα Στροφιλίας ΒΔ. Πελοποννήσου και φυτοκοινωνιολογικές του μονάδες. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, Τόμος ΚΗ, Θεσσαλονίκη 1985.]
Abstract: The general and the specific geographical distribution of the forest tree species which form the ecosystem of Strofilia forest and their biological behaviour, are investigated. A correlation of the data in relation to other facts of contemporary vegetation as well as of the historical course, supports the view that the forest tree species of the ecosystem might be in whole natural. After a chloristic, physiognomic and ecological investigation of the vegetation of the area, the zone, the sub-zone and the growing space of vegetation to which this forest belongs, has been defined. Plant samplings from pure and mixed stands have been taken for the definition of the plat-sociological units, and the table of classification of the different species has been constructed, based on the Braun-Blanquet method. On the basis of this table, the vegetation units of mixed or pure forms of the forest tree species of the ecosystem have been distinguished.
Key-words: Forest ecosystem, sand dunes, succession, vegetation unit

Konstantinidis P., Chatziphilippidis G. (1993): Plant-Communities analysis of Pinus pinea forests of Sithonia Peninsula (Chalkidiki). Geotechnic Scientific Issue, vol. 4/2, 13-22. [Φυτοκοινωνιολογική ανάλυση του δάσους Κουκουναριάς της Β. Σιθωνίας Χαλκιδικής. γεωτεχνικά επιστημονικά θέματα, τόμος 4 (2), 1993, σελ. 13-22.
Abstract: *Pinus pinea* has been cultivated for its seeds since the ancient times, thus it is a very difficult task to establish its natural area. According to researchers and relative bibliography, it may be natural in the East Mediterranean region and in the Sithonia Peninsula. Its sole familiar variety is *Pinus pinea* v. fragilis Dumahel. It creates a sole pure forest on a flat plateau at an altitude of about 300 m, in the Sithonia peninsula in northern Greece. Its development is very satisfactory and its regeneration can be realized even below thick shrubs. Its plant-community was classified in the *Erico-Pinetum pinea* association. A mixed stand of *Pinus pinea* and *Pinus halepensis* is created around this forest, which belongs to the *Cisto-Ericetum arboreae Pinetosum pinea* sub-association and *Cocciferetum Pinetosum pinea* sub-association. Around the mixed forest, where *Pinus halepensis* appears pure, the vegetation belongs to the *Pinetum halepensis manipuliforeae*, *Cisto-Ericetum arboreae* and *Coccifetum associations*.
Key-words: Pinus pinea, plant communities, succession, regeneration

Mavrommatis G. (1976): An approach to the ecosystem of Samaria National Park, Crete
Anakinosis I.D.E.A. vol. IV/1 [Διερεύνησις του οικοσυστήματος εθνικού δρυμού Σαμαριάς Κρήτης. "Ανακοινώσεις Ι.Δ.Ε.Α.", Τόμος IV, Τεύχος 1.]
Abstract: The description and analysis of the vegetation of Samaria National Park, Crete, based on the geological, geomorphologic and bioclimatic data are presented. The zonal vegetation, its phyto-sociological composition, and a list of the indigenous species are given. Data of the park wildlife are also given, the human influence on the environment is analysed, an ecological composition of the environment is attempted, and some ideas on the functions of the whole ecosystem are discussed.
Key-words: National Park, vegetation types, succession, conservation

Mavrommatis G. (1984): The typical Mediterranean forest of sclerophyllous, evergreen broadleaves in Sapientza island
Proceedings of the International Conference on Protected Natural Areas held in Athens, on May 23-25, 1984, 303-209. [Το τυπικό μεσογειακό δάσος σκληροφύλλων, αειφύλλων πλατυφύλλων της νήσου Σαπιέντζας. Πρακτικά Διεθνούς Συνεδρίου "Προστατευόμενες Φυσικές Περιοχές", Αθήνα 23-25/5/1984, σελίδες 203-209]
Abstract: In karstic concavities, in Sapientza island in the golf of Methoni in Peloponese, broad-leaved evergreen species in treelike form of a height 8 to 10 m are found. The stands include *Pistacia lentiscus*, *Phillyrea media*, *Olea europea* ssp.*oleaster*, *Arbutus unedo*, *Quercus coccifera* and *Quercus ilex*. They are relics of a typical mediterranean forest of screrophyllous, evergreen broadleaves. The presence of these stands in places where the soil is well preserved, is an evidence that the Climax vegetation of the mediterranean zone in Greece is the forest.
Key-words: Evergreen forest, succession, structure, conservation

Smiris P. (1987): The dynamic evolution of the structure of the virgin forest of Paranesti.
Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, vol. 30. [Η δυναμική εξέλιξη της δομής στο παρθένο δάσος του Παρανεστίου. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, Τόμος Λ, Θεσσαλονίκη 1987.]
Abstract: The virgin forest of Paranesti, a Natural Monument (Strict Nature Reserve) at the Greek - Bulgarian border, is composed of beech, fir and Norway spruce. A detailed investigation of stand structure characteristics and of the evolution processes at each development phase, is made in the study. Species composition at each phase and factors influencing it, are also dealt with. The transfer of acquired knowledge to silvicultural practice in managed forests of similar conditions, is attempted too. To this effect, suggestions are made for the necessary treatments in order to create uneven aged, production stands.
Key-words: Structure, succession, conservation

Spanos I., Spanos K. (1996): Post-fire establishment and survival of *Pinus brutia* in the island of Thasos
Proceedings of the Second Balkan Scientific Conference on Investigation, Preservation and Utilisation of Forest Resources, 3 -5 June, 1996, Sofia, Bulgaria.
Abstract: The establishment of natural regeneration in the island of Thasos within the natural stands of *Pinus brutia*, after the great fire in August 1989, was investigated. The number of survived seedlings and their evolution for the next five years was studied on various exposures and site conditions. Five thousands (5000) ha of *Pinus brutia* were destroyed in 1989. Today the natural regeneration in the post fire areas is sufficient, although high percentage of seedlings were destroyed by goats, dry climatic conditions, diseases and removal of burned trees. Forty one (41) permanent experimental plots, which were left to free grazing, were established. After five years, more than sixty per cent (60%) of seedlings were destroyed by the goats. On high

elevation sites with steep slopes, natural regeneration is not sufficient, because of intense soil erosion. On these sites forest restoration can be done by artificial reforestation, using seed or planting material derived from selected seed stands of *Pinus brutia*, which is adapted to the climatic and soil conditions of the island of Thasos.
Key-words: *Pinus brutia*, regeneration, succession

Zagas Th. (1994): The ecosystems of mount Olympus. Proposals for the restoration of the degraded ecosystems on its western and southern slopes. Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, vol. 37 [Τα οικοσυστήματα του Ολύμπου και προτάσεις για την ανόρθωση των υποβαθμισμένων οικοσυστημάτων των δυτικών και νοτίων πλαγιών του. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, τόμος ΛΖ/1994.]
Abstract: The paper is dealing with the ecosystems of mount Olympus, as well as with the problem of restoration of the degraded ecosystems on its western and southern slopes. A description of the main natural ecosystems in the area is followed by an analysis of the main causes responsible for the degradation of the ecosystems, appearing on the western and southern slopes of the mountain. General and special aspects as well as silvicultural measures based on the above mentioned analysis are proposed in order to improve the present situation.
Key-words: Vegetation types, biodiversity, conservation, restoration

Biodiversity aspects related to stand structure

Papageorgiou A., Panetsos K. P., Hattemer H. H. (1994): Genetic differentiation of natural Mediterranean Cypress (Cupressus Sempervirens L.) populations in Greece
Forest Genetics 1/1, 1-12
Abstract: The Mediterranean cypress has a disjunct geographic distribution in Greece. It mainly consists of small natural stands found in Crete and in other Aegean islands, but it also has been introduced, mostly as the pyramidalis form in many localities. The nature and magnitude of genetic variation of natural and introduced stands are studied. Twenty five (25) populations representing different population histories, geographic localities and ecological site conditions were sampled. Large intrapopulational and moderate interpopulational variation was found. Natural populations showed much more variation within stands than introduced ones. Natural stands, which are the remnants of extensive forests of the past, somehow managed to avoid the bottleneck effect and to maintain high levels of heterozygosity and allelic diversity.
Key-words: Natural forests, Cypress, variability

Comparisons between natural forest / managed forest applications for silviculture

Grigoriadis N. (1991): Contribution to the research on management of beech forests
Scientific Annals of the Department of Forestry and Natural Environment, University of Thessaloniki, vol. 34/3. [Συμβολή στην έρευνα διαχείρισης δασών οξυάς. Επιστημονική Επετηρίδα του Τμήματος Δασολογίας και Φυσικού Περιβάλλοντος, Πανεπιστήμιο Θεσσαλονίκης, ΤόμοςΛΔ/3].
Abstract: The structure and regeneration process of pure beech stands, at altitudes between 900 and 1800 m on Pieria mountains, in northern Greece, are studied. Plots were established on east, north and west slopes. Treatments were carried out, in a closed stand, in a stand with a small opening, in a stand with an enlarged opening, and in a stand with evenly broken canopy. The forest under research is composed of beech stands more than 150 years old, having an overstorey and an understorey. A qualitative evaluation of the overstorey trees showed that only 15% of them could be considered valuable as far as timber is concerned. Regeneration in many places was not developing well, because the canopy of the stands had remained closed for a long time.

Silvicultural treatment, altitude and exposure, are of great importance for the establishment and development of natural regeneration.
Key-words: Management, silviculture, regeneration

Spanos K., Trakolis D., Malamidis G. (1997): Forest ecosystems and conservational management of Pindos National Park – Greece. Proceedings of the International Congress on Naturalness and European Forests, Strasbourg, 26 - 29 October 1997.
Abstract: The forests of Pindos National Park consist mainly of *Pinus nigra* Arn., *Fagus sylvatica* L., *Fagus moesiaca* (K. Maly) Czecz., *Pinus heldreichii* Christ., and *Abies borissii-regis* Mattf. The forest ecosystems have been classified and described according to the Braun-Blanquet vegetation classification system as follows: (a). Zone of beech forests, beech-fir and mountainous para-mediterranean conifers (Fagetalia, mountainous - subalpine). (b). Zone of cold-resistant mountainous conifers (Vaccinio-picetalia, mountainous - subalpine). (c). Zone above timber line - high mountains (Astagalo- Acantholimonetalia). (d). Sporadic species. The forest ecosystems of the peripheral zone of the National Park for timber management purposes, depending upon species, silvicultural system and management regime, have been classified into three management classes, those of black pine, beech and of Heldreich pine. Conservational management, natural regeneration, succession, dynamics and species competition have been also discussed.
Key-words: National Park, management , succession, dynamics, competition

Vouzaras A. (1980): Proposed silvicultural measures in the fir forest of the experimental watershed plots at Agios Nikolaos, Evritania. Anakinosis Idrimaton Dasikon Erevnon, vol. VIII/1 [Προτεινόμενοι χειρισμοί στο Ελατοδάσος του Ερευνητικού Κέντρου των Πειραματικών Λεκανών απορροής Αγίου Νικολάου Καρπενησίου. Περιοδικό "Ανακοινώσεις Ιδρυμάτων Δασικών Ερευνών", Τόμος VIII. Τεύχος 1.]
Abstract: A stand description of the uneven-aged fir forest of two experimental watersheds, at Agios Nikolaos in the region of Evritania in central Greece, is presented. For these watersheds the total timber volume and its annual increment is estimated according to the ten-parts system. Also the general aims of the Forest Hydrology research are revised according to the timber volume distribution in the diameter classes, the needs of the Administration for more applied research and the needs of the local people.
Key-words: Forest structure, silviculture, hydrology, watershed, management

Methods, systems (sampling plot development) for gathering information on natural forests (forest reserves)

Panagiotidis N. (1965): Long-term forest experimental plots
Special issue of the Forest Research Institute of Athens. [Μακροχρόνιαι δασικαί πειραματικαί επιφάνειαι (κριτήρια εκλογής εγκαταστάσεως, μεθοδικότητας λήψεως και επεξεργασίας των στοιχείων των πειραματικών επιφανειών, μετά αποτελεσμάτων επί στατιστικών δεδομένων εκ τεσσάρων εξ αυτών) "Αυτοτελής Έκδοση Ι.Δ.Ε.Α.".]
Abstract: The selection and establishment criteria of long-term experimental plots are presented, and the methods of data collection and data processing are analysed. A network of 43 plots was established covering the various forest types of the country, the size being smaller in the even-aged stands than that in the uneven-aged ones. The establishment of the plots aimed at the conduction of applied research, leading to methods of increasing the production of good quality timber, through improving stand structure and making the best use of site conditions. To this effect, many variables concerning the stand structure, the volume of trees and the site, were estimated and evaluated.
Key-words: Selection criteria, forest structure, stand variables, monitoring, results