

Curriculum vitae

George Karabourniotis



Affiliation

Professor, Laboratory of Plant Physiology, Agricultural University of Athens,

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Education

1984 PhD in Plant Physiology, University of Patras, Greece

1978 BSc in Biology, University of Patras, Greece

Research interests

Plant Stress Physiology: Photosynthesis/ Xerophytic adaptations/
Optical, chemical and defensive properties of superficial plant
structures

Publications

55 publications, 7 reviews, 18 communications in international, 62 in
local congresses

1. Karabourniotis, G., Manetas, Y., Gavalas, N.A. 1983. Photoregulation of phosphoenolpyruvate carboxylase in *Salsola soda* and other C₄-plants. *Plant Physiology* 73: 735-739.
2. Manetas, Y., Karabourniotis, G., Gavalas, N.A. 1983. Post-translational regulation of C₄ and CAM phosphoenolpyruvate carboxylase. *Plant Physiology and Biochemistry* 21: 911-917.
3. Karabourniotis, G., Manetas, Y., Gavalas, N.A. 1985. Detecting photoactivation of phosphoenolpyruvate carboxylase in C₄-plants: An effect of pH. *Plant Physiology* 77: 300-302.
4. Selinioti, E., Karabourniotis, G., Manetas, Y., Gavalas, N.A. 1985. Modulation of phosphoenolpyruvate carboxylase by 3-phosphoglycerate: probable physiological significance for C₄-photosynthesis. *Journal of Plant Physiology* 121: 353-360.
5. Manetas, Y., Petropoulou, Y., Karabourniotis, G. 1986. Compatible solutes and their effects on phosphoenolpyruvate carboxylase of C₄-halophytes. *Plant, Cell and Environment* 9: 145-151.
6. Karabourniotis, G., Papadopoulos, K., Papamarkou, M., Manetas, Y. 1992. Ultraviolet-B radiation absorbing capacity of leaf hairs. *Physiologia Plantarum* 86: 414-418.
7. Karabourniotis, G., Kyparissis, A., Manetas, Y. 1993. Leaf hairs of *Olea europaea* L protect underlying tissues against ultraviolet-B radiation damage. *Environmental and Experimental Botany* 33: 341-345.

8. Karabourniotis, G., Papastergiou, N., Kabanopoulou, E., Fasseas, C. 1994. Foliar sclereids of *Olea europaea* L. may function as optical fibers. *Canadian Journal of Botany* 72 : 330-336.
9. Grammatikopoulos, G., Karabourniotis, G., Kyparissis, A., Petropoulou, Y., Manetas, Y. 1994. Leaf hairs of olive (*Olea europaea* L.) prevent stomatal closure by ultraviolet-B radiation. *Australian Journal of Plant Physiology*: 21: 293-301.
10. Skaltsa, E., Verykokidou, E., Harvala, C., Karabourniotis, G., Manetas, Y. 1994. UV-B protective potential and flavonoid content of leaf hairs of *Quercus ilex*. *Phytochemistry*: 37: 987-990.
11. Karabourniotis, G, Kotsabassidis, D., Manetas, Y. 1995. Trichome density and its protective potential against ultraviolet-B radiation damage during leaf development. *Canadian Journal of Botany* 73: 376-383.
12. Karabourniotis, G., Fasseas, C. 1996. The dense indumentum with its polyphenol content may replace the protective role of the epidermis in some young xeromorphic leaves. *Canadian Journal of Botany* 74: 347-351.
13. Manetas, Y., Petropoulou, Y., Stamatakis, K., Nikolopoulos, D., Levisou, E., Psaras, G., Karabourniotis, G. 1997. Beneficial effects of enhanced Uv-B radiation under field conditions: Improvement of needle water relations and survival capacity of *Pinus pinea* L. seedlings during the dry Mediterranean summer. *Plant Ecology*: 128: 100-108.
14. Liakoura, V., Stefanou, M., Manetas, Y., Cholevas, C. And Karabourniotis, G. 1997. Trichome density and its Uv-B protective potential are affected by shading and leaf position on the canopy. *Environmental and Experimental Botany* 38: 223-229.
15. Drilias, P., Karabourniotis, G., Levizou, E., Nikolopoulos, N., Petropoulou, Y., And Manetas, Y. 1997. The effects of enhanced Uv-B radiation on the Mediterranean evergreen sclerophyll *Nerium oleander* depend on the extent of summer precipitation. *Australian Journal of Plant Physiology*. 24: 301-306.
16. Karabourniotis, G., Kofidis, G., Fasseas, C., Liakoura, V., And Drossopoulos, I. 1998. Polyphenol deposition on leaf hairs of *Olea europaea* (Oleaceae) and *Quercus ilex* (Fagaceae). *American Journal of Botany* 85: 1007-1012.
17. Karabourniotis, G. 1998. Light-guiding function of foliar sclereids in the evergreen sclerophyll *Phillyrea latifolia*: A quantitative approach. *Journal of Experimental Botany* 49: 739-746.
18. Karabourniotis, G, Bornman J. F. And Liakoura, V. 1999. Different leaf surface characteristics of three grape cultivars affect leaf optical properties as measured with fibre optics. Possible implication in Stress tolerance. *Australian Journal of Plant Physiology* 26: 47-53.
19. Karabourniotis, G, and Bornman J. F. 1999. Penetration Of Uv-A, Uv-B and blue light through the leaf trichome layers of two xeromorphic plants, olive and oak, measured by optical fibre microprobes. *Physiologia Plantarum* 105: 655-661.
20. Liakoura, V., Stavrianakou, S., Liakopoulos, G., Karabourniotis, G. and Manetas Y. 1999. Uv-B radiation effects on *Olea europaea*: Comparisons between a glasshouse and a field experiment. *Tree Physiology* 19: 905-908.
21. Karabourniotis, G., Bornman, J. F. Nikolopoulos, D. 2000. A possible optical role of the bundle sheath extensions of the heterobaric leaves of *Vitis vinifera* and *Quercus coccifera*. *Plant Cell and Environment* 23: 423-430
22. Liakoura, V. Manetas Y. And Karabourniotis G. 2001. Seasonal fluctuations in the concentration of Uv absorbing compounds in leaves of some Mediterranean plants under field conditions. *Physiologia Plantarum* 111: 491-500.
23. Karabourniotis G., Tzobanoglou D., Nikolopoulos D. And Liakopoulos G. 2001. Epicuticular phenolics over guard cells: Exploitation for *In Situ* stomatal counting by fluorescence microscopy and combined Image analysis. *Annals of Botany* 87: 631-639.

24. Liakopoulos G., Stavrianakou S. and Karabourniotis G. 2001. Analysis of epicuticular phenolics of *Prunus persica* and *Olea europaea* leaves: Evidence on the chemical origin of the leaf surface Uv-Induced blue fluorescence of stomata. *Annals of Botany* 87: 641-648.
25. Nikolopoulos D. Liakopoulos G. Drossopoulos I., and Karabourniotis G. 2002. The relationship between anatomy and photosynthetic performance of heterobaric leaves. *Plant Physiology* 129: 235-243.
26. Liakoura V., Bornman, J.F. and Karabourniotis G. 2003. The ability of abaxial and adaxial epidermis of sun and shade Leaves to attenuate Uv-A and Uv-B radiation. *Physiologia Plantarum* 117: 33-43.
27. Stavrianakou S., Liakoura V., Levizou E., Karageorgou P., Delis C., Liakopoulos G., Karabourniotis G. and Manetas Y. 2004. Allelopathic effects of water-soluble leaf epicuticular material from *Dittrichia viscosa* on seed germination of 16 neighboring species, weeds and cultivated plants. *Allelopathy Journal* 14: 35-42.
28. Liakopoulos G., Stavrianakou S., Filippou M., Fasseas K., Tsadilas C., Drossopoulos I. and Karabourniotis G. 2005. Boron remobilization under low boron supply in olive (*Olea europaea* L.) in relation to leaf and phloem mannitol concentrations. *Tree Physiology* 25: 157-165.
29. Liakopoulos G. And Karabourniotis G. 2005. boron deficiency and concentrations and composition of phenolic compounds in *Olea europaea* leaves: A combined growth chamber and field study, *Tree Physiology* 25: 307-315.
30. Liakopoulos G., Stavrianakou S. and Karabourniotis G. 2005. Trichome layers versus dehaired lamina of *Olea europaea* leaves: Differences in flavonoid distribution, Uv absorbing capacity, and wax yield, *Environmental And Experimental Botany* 55: 294-304.
31. Stavrianakou S., Liakopoulos G. and Karabourniotis G. 2006. Boron deficiency effects on growth, photosynthesis and relative concentrations of phenolics of *Dittrichia viscosa* (Asteraceae), *Environmental and Experimental Botany* 56: 293-300.
32. Stavrianakou S., Liakopoulos G. And Karabourniotis G. 2006. Low-Boron acclimation Induces uptake of boric acid against a concentration gradient in root cells of *Olea europaea*. (Research Note). *Functional Plant Biology* 33: 189-193.
33. Liakopoulos G., Nikolopoulos D., Klouvatou A., Vekkos K.-A., Manetas Y. and Karabourniotis G. 2006. The photoprotective role of epidermal anthocyanins and surface pubescence in young leaves of grapevine (*Vitis Vinifera* L.). *Annals of Botany* 98: 257-265.
34. Stavroulaki V., Liakopoulos G., Nikolopoulos D., and Karabourniotis G. 2007. Deposition of epicuticular Blue-Fluorescing phenolics over guard cells during leaf development of *Prunus persica* leaves. *Flora* 202: 261-267
35. Filippou M., Fasseas C. and Karabourniotis G. 2007. Photosynthetic characteristics of olive tree (*Olea Europaea*) bark. *Tree Physiology* 27: 977-984,
36. Travlos Is, Liakopoulos G, Karabourniotis G and Karamanos Aj. 2008. Circadian leaflet movements of *Tylosema esculentum* (Burch) A. Schreib, and the abolishment of these diurnal movements by potassium deficiency. *Journal of Arid Environments*, 72: 1745-1750.
37. Nikolopoulos D, Korgiopoulou C, Mavropoulos K, Liakopoulos G and Karabourniotis G. 2008. Leaf anatomy affects the extraction of photosynthetic pigments by DMSO. *Talanta* 76: 1265-1268.
38. Liakoura V, Fotelli My, Rennenberg H, Karabourniotis G. 2009. Should structure to function relationships be considered separately for homobaric vs heterobaric leaves? *American Journal of Botany*, 96: 612-619.
39. Liakopoulos G., Stavrianakou S., Nikolopoulos D., Karvonis, E., Vekkos K.-A., Psaroudi V.C. and Karabourniotis G. 2009. Quantitative relationships between boron and mannitol concentrations in phloem exudates of *Olea europaea* leaves under contrasting boron supply conditions. *Plant and Soil*, 323: 177-186.

40. Assimakopoulou A., Tsougrianis, C., Elena, K., Fasseas, C., Karabourniotis, G. 2009. Pre-Harvest rind-spotting in ‘Clementine’ mandarin. *Journal of Plant Nutrition* 32:1486-1497.
41. Stavrianakou S., Liakopoulos G, Miltiadou D, Markoglou An., Ziogas Bn. and Karabourniotis G. 2010. Antifungal and antibacterial capacity of extracted material from non-glandular and glandular leaf hairs applied at physiological concentrations. *Plant Stress* 4: 25-30
42. Karioti A, Tooulakou G, Bilia A R, Psaras G K., Karabourniotis G, And Skaltsa H. 2010. Erinea formation on *Quercus ilex* leaves: Anatomical, physiological and chemical responses of leaf hairs against mite attack. *Phytochemistry* 72: 230-237.
43. Bresta P, Nikolopoulos D, Ekonomou G, Vahamidis P, Lyra D, Karamanos A, Karabourniotis G. 2011. Modification of water entry (xylem vessels) and water exit (stomata) orchestrates long term drought acclimation of wheat leaves. *Plant and Soil* 347: 179-193
44. Fernández V, Khayet M, Montero-Prado P, Heredia-Guerrero J A, Liakopoulos G, Karabourniotis G, Del Rio V, Domínguez E, Tacchini I, Nerín C, Val J, And Heredia A. 2011. New insights into the properties of pubescent surfaces: The peach fruit (*Prunus persica* Batsch) as a model. *Plant Physiology* 156: 2098-2108
45. Liakopoulos, G., Psaroudi, V., Stavrianakou, S., Nikolopoulos, D., Karabourniotis, G. 2012. Acclimation of eggplant (*Solanum melongena*) to low boron supply. *Journal of Plant Nutrition and Soil Science*, 175 : 189-195.
46. Sumbele, S., Fotelli, Mn., Nikolopoulos, D., Tooulakou, G., Liakoura, V., Liakopoulos, G., Bresta, P., Dotsika, E., Adams, Ma., Karabourniotis G. 2012. Photosynthetic capacity is negatively correlated with the concentration of leaf phenolic compounds across a range of different species. *Aob Plants* **2012**: Pls025; Doi:10.1093/Aobpla/Pls025.
47. Fernández, V, Sancho-Knapik, D, Guzmán, P, Peguero-Pina, Jj, Gil, L, Karabourniotis, G, Khayet, M, Fasseas, C, Heredia-Guerrero, Ja, Heredia, A, And Gil-Pelegrin E. 2014. Wettability, polarity and water absorption of *Quercus ilex* leaves: Effect of leaf side and age. *Plant Physiology*, 166: 168-180.
48. Tooulakou G, Giannopoulos A, Nikolopoulos D, Bresta P, Dotsika E, Orkoula MG, Kontoyannis CG, Fasseas C, Liakopoulos G, Klapa I Karabourniotis G. 2016. “Alarm Photosynthesis”: Calcium oxalate crystals as an internal CO₂ source in plants. *Plant Physiology* 171: 2577–2585
49. Bresta P, Nikolopoulos D, Stavroulaki V, Vahamidis P, Ekonomou G, Karabourniotis G. 2018. How does long-Term drought acclimation modify structure-function relationships? A quantitative approach to leaf phenotypic plasticity of barley. *Functional Plant Biology* 45: 1181-1194
50. Giannopoulos, A, Bresta, P, Nikolopoulos, D, Liakopoulos, G, Fasseas C, Karabourniotis, G. 2018. Changes in the properties of calcium-carbon inclusions during leaf development and their possible relationship with leaf functional maturation in three inclusion-bearing species. *Protoplasma* 256: 349-358 <https://doi.org/10.1007/s00709-018-1300-7>
51. Tooulakou G, Nikolopoulos D, Dotsika E, Orkoula MG, Kontoyiannis CG, Liakopoulos G, Klapa MI, Karabourniotis G. 2018. Changes in size and composition of pigweed (*Amaranthus hybridus* L.) calcium oxalate crystals under CO₂ starvation conditions. *Physiologia Plantarum* 166: 862-872
52. Korgiopolou C, Bresta P, Nikolopoulos D, Karabourniotis G. 2019. Sex-specific leaf structural and functional traits and sun-shade acclimation in the dioecious tree *Pistacia vera* (Anacardiaceae). *Functional Plant Biology* 46: 649-659
53. Giannopoulos A, Nikolopoulos D, Bresta P, Samantas A, Reppa C, Karaboiki K, Dotsika E, Fasseas C, Liakopoulos G, Karabourniotis G. 2019. Cystoliths of *Parietaria judaica* as an internal source of CO₂ for photosynthetic assimilation when stomata are closed. *Journal of Experimental Botany* 70: 5735-5763

54. Roig-Oliver M, Bresta P, Nadal M, Liakopoulos G, Nikolopoulos D, Karabourniotis G, Bota J, Flexas J. 2020. Cell wall composition and thickness affect mesophyll conductance to CO₂ diffusion in *Helianthus annuus* under water deprivation. *Journal of Experimental Botany*, eraa413, <https://doi.org/10.1093/jxb/eraa413>
55. Gómez-Espinoza O, González-Ramírez D, Bresta P, Karabourniotis G, Bravo L. 2020. Decomposition of calcium oxalate crystals in *Colobanthus quitensis* under CO₂ limiting conditions. *Plants*, accepted

Reviews

1. Karabourniotis G. and Liakopoulos G.. 2006. Phenolic compounds in plant cuticles: Physiological and ecological aspects. *Advances in Plant Physiology*, 8: 33-47.
2. Liakopoulos G. Nikolopoulos D. and Karabourniotis G.. 2007. The first step from light to wine: Photosynthetic performance and photoprotection of grapevine (*Vitis Vinifera* L.) leaves. *Functional Plant Science and Biotechnology* 1: 112-119 (Invited Review)
3. Liakopoulos G., Stavrianakou S. and Karabourniotis G. 2008. Cellular boron: So many interactions for such a few roles? *Advances in Plant Physiology*, 10: 319-336.
4. Karabourniotis G, Liakopoulos G, Nikolopoulos D, Bresta P, Stavroulaki V, and Sumbele S. 2014. Carbon gain vs. water saving, growth vs. defence": Two dilemmas with soluble phenolics as a joker. *Plant Science*, 227: 21–27 (Invited Review).
5. Tooulakou G, Giannopoulos A, Nikolopoulosd, Bresta P, Dotsika E, Orkoula MG, Kontoyannis CG, Fasseas C, Liakopoulos G, Klapa I Karabourniotis G. 2016. Reevaluation of the plant “gemstones”: Calcium oxalate crystals sustain photosynthesis under drought conditions. *Plant Signaling and Behavior* DOI: 10.1080/15592324.2016.1215793 (Invited review).
6. Karabourniotis G, Liakopoulos G, Nikolopoulos D and Bresta P. 2020. Protective and defensive roles of non-glandular trichomes against multiple stresses: Structure-function coordination. *Journal of Forestry Research* 31: 1-12 (Invited review).
7. Karabourniotis G, Horner HT, Bresta P, Nikolopoulos D, Liakopoulos G. 2020. New insights on the functions of carbon-calcium-inclusions in plants. *New Phytologist* accepted (Invited review).

Citations

Citations to publications exceed 1850 (Scopus) 2700 (Scholar)

Special Citation: “discoveries”, *Wildlife* (BBC) 13(12): 26.

Special Citation: <https://www.botany.one/2016/12/alarmed-role-druse-crystals/>

https://en.wikipedia.org/wiki/Alarm_photosynthesis

Research projects

Leader in 6 and collaborator in other 5 research projects

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- Textbooks***
1. Karabourniotis G. 2003. Stress Physiology of Plants. Embryo Publications. Athens. (in greek).
 2. Roubelakis-Agelakis P. (Ed). 2003. Plant Physiology. University of Crete Publications. Heraklion. (in greek).
 3. Karabourniotis G. (Ed.). 2005. General Botany. Embryo Publications. Athens. (in greek)
 4. Thanos C. (Ed.). 2011. Translation of the Plant Physiology (Taiz and Zeiger) in greek. (Co-author).
 5. Karabourniotis G. (Ed.). 2012. Stress Physiology of Plants. Embryo Publications. Athens (in greek).
 6. Karabourniotis G. (Ed.). 2013. Functional Plant Anatomy. Embryo Publications. Athens (in greek)
 7. Karabourniotis G. (Ed.). 2016. Plant Physiology. Embryo Publications. Athens (in greek)
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Supervision and Teaching experience

Supervisor in Ph.D Theses: 8 (finished),
Supervisor in M.Sc. Theses: 13 (finished)
Supervisor in B.Sc. Theses: 26 (finished),
Courses Taught (undergraduate level): General Botany, Functional Plant Anatomy, Plant Physiology, Plant Stress Physiology, Biodiversity and Ecophysiology of Mediterranean Plants, Stress Symptom Diagnosis
Courses Taught (post graduate level): Plant –Microbe Interactions, Secondary Metabolites, Photosynthesis.

Administrative duties

Senate member of AUA, (2000-2001, 2003-2004), Director of the Laboratory of Plant Physiology (2005-), Director of the Faculty of Plant Biology (2009-), General Coordinator of the research programs Pythagoras II-Environment (authorised by the Senate of the AUA) (2006-2009), General Coordinator of the research programs Heraklitos II- (authorised by the Senate of the AUA) (2011-2014)

Last update: 2020

