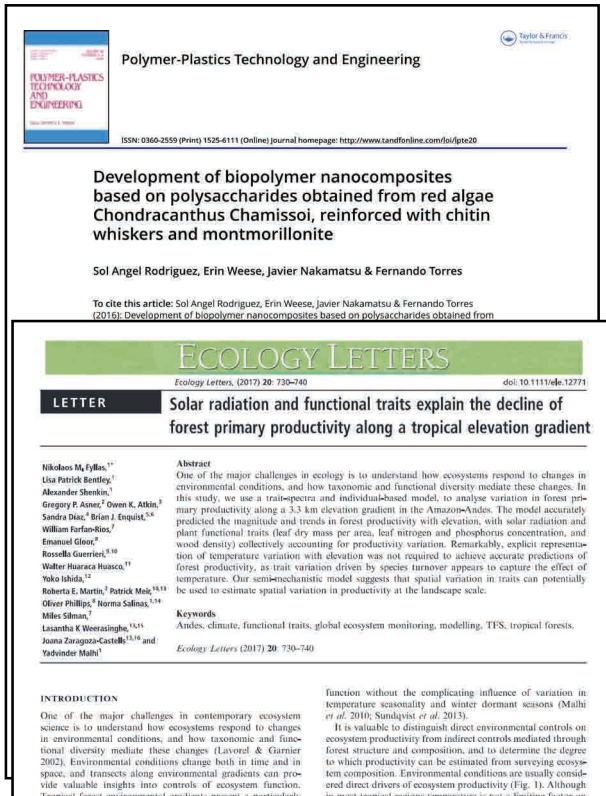
Aquí encontrará la primera página y el link (solo accesible en el formato digital) de todos los artículos publicados en revistas científicas internacionales por los integrantes de la Sección Química de la PUCP durante 2017.*



Polymer-Plastics Technology and Engineering

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Development of biopolymer nanocomposites based on polysaccharides obtained from red algae Chondracanthus Chamissoi, reinforced with chitin whiskers and montmorillonite

Sol Angel Rodriguez, Erin Weese, Javier Nakamatsu & Fernando Torres

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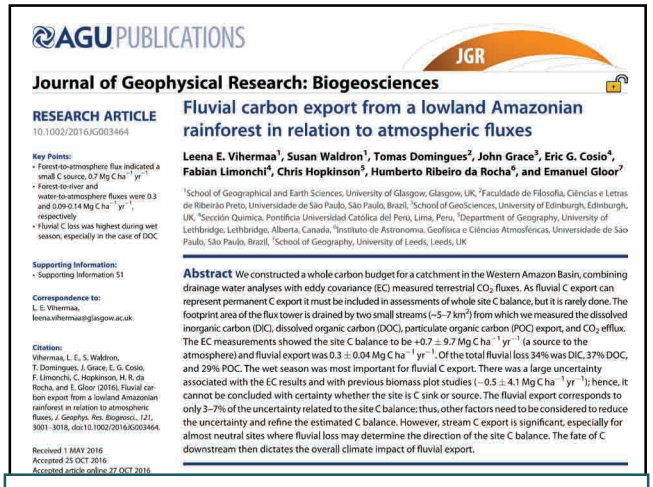

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Biogeosciences

RESEARCH ARTICLE

10.1002/2016JG003464

Fluvial carbon export from a lowland Amazonian rainforest in relation to atmospheric fluxes

Leena E. Vihermaa[1], Susan Waldron[1], Tomas Domingues[2], John Grace[3], Eric G. Cosio[4], Fabian Limonchi[4], Chris Hopkinson[5], Humberto Ribeiro da Rocha[6], and Emanuel Gloor[7]

ECOLOGY LETTERS

Ecology Letters, (2017) 20: 730–740 doi: 10.1111/ele.12771

LETTER

Solar radiation and functional traits explain the decline of forest primary productivity along a tropical elevation gradient

Research

New Phytologist

Scaling leaf respiration with nitrogen and phosphorus in tropical forests across two continents

Lucy Rowland[1,2]*, Joana Zaragoza-Castells[1,2]*, Keith J. Bloomfield[3], Matthew H. Turnbull[4], Damien Bonal[5], Benoit Burban[6], Norma Salinas[7], Eric Cosio[8], Daniel J. Metcalfe[9], Andrew Ford[9], Oliver L. Phillips[10], Owen K. Atkin[3,11] and Patrick Meir[2,3]

Applied Polymer Science

Laccase-mediated grafting of polyphenols onto cationized cotton fibers to impart UV protection and antioxidant activities

Suyeon Kim[1], Hyunkyung Lee[2], Juhea Kim[2], Fernando Oliveira[3], Pedro Souto[4], Hyerim Kim[5], Javier Nakamatsu[6]

Solo se incluyen artículos de miembros de la Sección Química de la PUCP que aparezcan firmados con la afiliación a esta sección, independientemente de si los colaboradores son, o no, de la PUCP desde el 1 de obtubre de 2016 hasta el 15 de diciembre de 2017 (no se incluyen artículos aceptados en 2017 que aparezcan con fecha de 2018 en la revista). El acceso al artículo depende de la suscripción del usuario a las editoriales correspondientes. Se han incluido solo revistas científicas que se encuentran indexadas en las bases de datos Scopus y Web of Science, de reconocido prestigio internacional.

Analytical Chemistry Research 12 (2017) 74–81

Contents lists available at ScienceDirect

Analytical Chemistry Research

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Sensors based on Ag-loaded hematite (α-Fe_2O_3) nanoparticles for methyl mercaptan detection at room temperature

Daniel Garcia [a], Gino Picasso [a,*], Pilar Hidalgo [b], Henrique E.M. Peres [c], Rosario Sun Kou [d], Josué M. Gonçalves [e]

[a] Laboratory of Physical Chemistry Research, Faculty of Sciences, National University of Engineering, Av. Tupac Amaru 210, Rimac, Lima 25, Peru
[b] Laboratory of Nanotechnology, Faculty of Gama, Area Especial de Indústria Projeção A, UNB – DF-480, University of Brasilia, Gama Leste, Brasilia DF, 72444-240, Brazil
[c] Department of Electronic System Engineering, EPUSP, University of São Paulo, Av. Prof. Luciano Gualberto, 158, Trav. 3, São Paulo, SP, 05508-900, Brazil
[d] Department of Sciences, Section of Chemistry, Pontifical Catholic University of Peru, Av. Universitaria 1801, San Miguel, Lima 32, Peru
[e] Department of Fundamental Chemistry, Institute of Chemistry, University of São Paulo, Av. Prof. Lineu Prestes 748, Butantã, São Paulo, 05508-000, Brazil

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Keywords:
Hematite
Gas sensor
Ag-loaded hematite
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ABSTRACT

Sensors based on Ag/α-Fe_2O_3 nanoparticles have been prepared by the coprecipitation method f
sensing methyl mercaptan at room temperature. X-ray diffraction patterns of samples matched perfec
with characteristic peaks of hematite with no peaks assigned to Ag even at the highest concentratic
STEM images and EDX analysis revealed the presence of Ag nanoparticles (from 2 to 5 nm) which we
highly dispersed onto α-Fe_2O_3 surface with an Ag/Fe ratio from 0.014 to 0.059. The Ag nanoparticles we
deposited on the hematite surface. Sensing tests of Ag-loaded hematite nanoparticles showed mu
higher response signal than the unmodified sensor. Hematite loaded with 3%(Wt) Ag showed the highe
response with a linear dependence from 20 to 80 ppm. The sensor also depicted a good selectivity a
stability during 4 days with short recovery time. The high dispersion of reduced Ag evaluated by X
analysis played an important chemical role in the sensing mechanism that favored the contact of CH_3
with oxygen.

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Highly sensitive ratiometric quantification of cyanide in water with gold nanoparticles via Resonance Rayleigh Scattering

Yulán Hernández[a], Yves Coello[a,*], Raluca M. Fratila[b], Jesús M. de la Fuente[b], Troy A. Lionberger[c,d,1]

[a] Departamento de Ciencias, Sección Química, Pontificia Universidad Católica del Perú PUCP, Lima, Peru
[b] Instituto de Ciencia de Materiales de Aragón (University of Zaragoza/CSIC) and CIBER-BBN, Calle Pedro Cerbuna 12, 50009 Zaragoza, Spain
[c] Department of Physics, University of California, Berkeley, CA 94720, United States
[d] Howard Hughes Medical Institute, University of California, Berkeley, CA 94720, United States

ARTICLE INFO

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Gold nanoparticles
Resonance Rayleigh Scattering
UV–Vis absorption spectroscopy
Cyanide detection
Chemical sensors
Analytical methods

ABSTRACT

A highly sensitive and selective ratiometric sensor for the quantification of cyanide (CN^-) in aqueous sa
has been developed using spherical gold nanoparticles (AuNPs) stabilized by polysorbate 40 (PS-40).
different AuNP sizes (14, 40 and 80 nm mean diameters) were used to evaluate the response of the sensor
both colorimetric and Resonance Rayleigh Scattering (RRS) detection schemes. The best results were obt
for the sensor using 40 nm AuNPs, for which the limits of detection (LODs) were found to be 100 nmol L^{-1}
benchtop instrument and 500 nmol L^{-1} by the naked eye, values well below the maximum acceptable lev
drinking water (1.9 μmol L^{-1}) set by the World Health Organization (WHO). The practical use of the 4
AuNPs RRS sensor was demonstrated with the determination of CN^- in drinking and fresh waters. Finall
sensor was successfully implemented in a compact portable device consisting of two light-emitting d
(LEDs) and a miniature spectrometer, turning this sensor into a very potent tool for its application as a
routine field-deployable analytical method.

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Altitude effect on leaf wax carbon isotopic composition in humid tropical forests

Mong Sin Wu [a], Sarah J. Feakins [a,*], Roberta E. Martin [b], Alexander Shenkin [c], Lisa Patrick Bentley [c,1], Benjamin Blonder [c], Norma Salinas [c,2], Gregory P. Asner [b], Yadvinder Malhi [c]

[a] Department of Earth Sciences, University of Southern California, 3651 Trousdale Pkwy, Los Angeles, CA 90089, USA
[b] Department of Global Ecology, Carnegie Institution for Science, 260 Panama St, CA 94305, Stanford, USA
[c] Environmental Change Institute, School of Geography and the Environment, University of Oxford, South Parks Road, Oxford OX1 3QY, UK

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Abstract

The carbon isotopic composition of plant leaf wax biomarkers is commonly used to reconstruct paleoenvironmental conditions. Adding to the limited calibration information available for modern tropical forests, we analyzed plant leaf and leaf wax carbon isotopic compositions in forest canopy trees across a highly biodiverse, 3.3 km elevation gradient on the eastern flank of the Andes Mountains. We sampled the dominant tree species and assessed their relative abundance in each tree community. In total, 405 sunlit canopy leaves were sampled across 129 species and nine forest plots along the elevation profile for bulk leaf and leaf wax *n*-alkane (C_{29}–C_{33}) concentration and carbon isotopic analyses ($\delta^{13}C$); a subset (76 individuals, 29 spe-

New Phytologist — Research

The variation of productivity and its allocation along a tropic elevation gradient: a whole carbon budget perspective

Yadvinder Malhi[1], Cécile A. J. Girardin[1], Gregory R. Goldsmith[2], Christopher E. Doughty[1], Norma Salinas[1,d], Daniel B. Metcalfe[3], Walter Huaraca Huasco[4], Javier E. Silva-Espejo[4], Jhon del Aguilla-Pasquell[5], Filio Farfán Amézquita[4], Luiz E. O. C. Aragão[6,7], Rossella Guerrieri[8,9], Françoise Yoko Ishida[10], Nur H. A. Bahar[11], William Farfan-Rios[12], Oliver L. Phillips[13], Patrick Meir[9,11] and Miles Silman[12]

[1]Environmental Change Institute, School of Geography and the Environment, University of Oxford, Oxford, OX1 3QY, UK; [2]Ecosystem Fluxes Group, Laboratory for Atmospheric Chemistry, Paul Scherrer Institute, Villigen PSI 5232, Switzerland; [3]Department of Physical Geography and Ecosystem Science, Lund University, SE 223-62, Lund, Sweden; [4]Universidad Nacional San Antonio Abad del Cusco. Cusco, Peru; [5]IIAP, Iquitos, Peru; [6]Remote Sensing Division, National Institute for Space Research, Av. dos Astronautas, 1.758, São José dos Campos SP 12227-010, Brazil; [7]College of Life and Environmental Sciences, University of Exeter, Exeter, EX4 4QD, UK; [8]Centre for Ecological Research and Forestry Applications, CREAF c/o Universidad Autonoma de Barcelona, Edificio C 08290 Cerdanyola, Barcelona, Spain; [9]School of Geosciences, University of Edinburgh, Edinburgh, EH8 9XP, UK; [10]College of Marine and Environmental Sciences, Centre of Tropical Environmental and Sustainability Science, James Cook University, Cairns, Qld 4870, Australia; [11]ARC Centre of Excellence in Plant Energy Biology, Research School of Biology, Building 134, The Australian National University, Canberra, ACT 2601, Australia; [12]Department of Biology, Wake Forest University, Winston-Salem NC 27109, USA; [13]School of Geography, University of Leeds, Leeds, LS2 9JT, UK

Author for correspondence:
Yadvinder Malhi
Tel: +44 1865 285188
Email: yadvinder.malhi@ouce.ox.ac.uk

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Summary

- Why do forest productivity and biomass decline with elevation? To address this questi
research to date generally has focused on correlative approaches describing changes in wo
growth and biomass with elevation.
- We present a novel, mechanistic approach to this question by quantifying the autotro
carbon budget in 16 forest plots along a 3300 m elevation transect in Peru.

New Phytologist — Research

Leaf-level photosynthetic capacity in lowland Amazonian and high-elevation Andean tropical moist forests of Peru

Nur H. A. Bahar[1], F. Yoko Ishida[2], Lasantha K. Weerasinghe[1,3], Rossella Guerrieri[4,5], Odhran S. O'Sullivan[1], Keith J. Bloomfield[1], Gregory P. Asner[6], Roberta E. Martin[6], Jon Lloyd[2,7], Yadvinder Malhi[8], Oliver L. Phillips[9], Patrick Meir[1,5], Norma Salinas[8,10], Eric G. Cosio[10], Tomas F. Domingues[11], Carlos A. Quesada[12], Felipe Sinca[6], Alberto Escudero Vega[10], Paola P. Zuloaga Ccorimanya[13], Jhon del Aguila-Pasquel[14,15], Katherine Quispe Huaypar[13], Israel Cuba Torres[13], Rosalbina Butrón Loayza[16], Yulina Pelaez Tapia[13], Judit Huaman Ovalle[13], Benedict M. Long[1,17], John R. Evans[1,17] and Owen K. Atkin[1,18]

[1]Division of Plant Sciences, Research School of Biology, The Australian National University, Canberra, ACT 2601, Australia; [2]Centre for Tropical Environmental and Sustainability Science, College of Marine and Environmental Sciences, James Cook University, Cairns, Qld, Australia; [3]Faculty of Agriculture, University of Peradeniya, Peradeniya 20400, Sri Lanka; [4]Centre for Ecological Research and Forestry Applications (CREAF), Universidad Autonoma de Barcelona, Edificio C, 08290 Cerdanyola, Barcelona Spain; [5]School of Geosciences, University of Edinburgh, Edinburgh, EH9 3JN, UK; [6]Department of Global Ecology, Carnegie Institution for Science, Stanford, CA 94305, USA; [7]Department of Life Sciences, Imperial College London, Silwood Park Campus, Ascot, SL5 7PY, UK; [8]Environmental Change Institute, School of Geography and the Environment, University of Oxford, South Parks Road, Oxford, OX1 3QY, UK; [9]School of Geography, University of Leeds, Woodhouse Lane, Leeds, LS9 2JT, UK; [10]Seccion Química, Pontificia Universidad Católica del Perú, Av Universitaria 1801, San Miguel, Lima, Perú; [11]Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Sao Paulo, Brazil; [12]Instituto Nacional de Pesquisas da Amazonia (INPA), Manaus, Brazil; [13]Escuela Profesional de Biología. Universidad Nacional de San Antonio Abad del Cusco. Av de la Cultura, No. 733, Cusco, Perú; [14]Instituto de Investigaciones de la Amazonía Peruana (IIAP), Av. José A. Quiñones km. 2.5, Apartado Postal 784, Iquitos, Perú; [15]School of Forest Resources and Environmental Science, Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931, USA; [16]Museo de Historia Natural, Universidad Nacional de San Antonio Abad del Cusco. Av de la Cultura, No. 733, Cusco, Perú; [17]ARC Centre of Excellence for Translational Photosynthesis, Research School of Biology, The Australian National University, Building 134, Canberra, ACT 2601, Australia; [18]ARC Centre of Excellence in Plant Energy Biology, Research School of Biology, The Australian National University, Building 134, Canberra, ACT 2601, Australia

Author for correspondence:
Owen K. Atkin
Tel: +61 (0)2 6125 5046
Email: Owen.Atkin@anu.edu.au

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Key words: carboxylation capacity, elevation, leaf traits, nitrogen (N), phosphorus (P), ribulose bisphosphate regeneration, temperature, tropical forests.

Summary

- We examined whether variations in photosynthetic capacity are linked to variations in the environment and/or associated leaf traits for tropical moist forests (TMFs) in the Andes/western Amazon regions of Peru.
- We compared photosynthetic capacity (maximal rate of carboxylation of Rubisco (V_{cmax}), and the maximum rate of electron transport (J_{max})), leaf mass, nitrogen (N) and phosphorus (P) per unit leaf area (M_a, N_a and P_a, respectively), and chlorophyll from 210 species at 18 field sites along a 3300-m elevation gradient. Western blots were used to quantify the abundance of the CO_2-fixing enzyme Rubisco.
- Area- and N-based rates of photosynthetic capacity at 25°C were higher in upland than lowland TMFs, underpinned by greater investment of N in photosynthesis in high-elevation trees. Soil [P] and leaf P_a were key explanatory factors for models of area-based V_{cmax} and J_{max} but did not account for variations in photosynthetic N-use efficiency. At any given N_a and P_a, the fraction of N allocated to photosynthesis was higher in upland than lowland species. For a small subset of lowland TMF trees examined, a substantial fraction of Rubisco was inactive.
- These results highlight the importance of soil- and leaf-P in defining the photosynthetic capacity of TMFs, with variations in N allocation and Rubisco activation state further influencing photosynthetic rates and N-use efficiency of these critically important forests.

Introduction

Tropical moist forests (TMFs) play a significant role in the terrestrial carbon cycle, contributing one-third of global gross primary productivity (Beer *et al.*, 2010; Malhi, 2010). Understanding the factors that regulate leaf photosynthesis (A) in TMFs is a prerequisite for modelling carbon storage in tropical ecosystems, with A being influenced *inter alia* by nutrient supply [particularly nitrogen (N) and phosphorus (P)], elevation and growth temperature.

Early studies in lowland TMFs implicated low foliar P concentrations as a major influence on light-saturated net photosynthesis

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Eco-friendly modification of earthen construction with carrageenan Water durability and mechanical assessment

Javier Nakamatsu [a], Suyeon Kim [b], Jorge Ayarza [a], Eduardo Ramírez [c], Mariela Elgegren [a], Rafael Aguilar [a,*]

[a] Department of Science, Chemistry Division, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, Lima 32, Peru
[b] Department of Engineering, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, Lima 32, Lima, Peru
[c] Department of Engineering, Civil Engineering Division, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, San Miguel, Lima 32, Peru

HIGHLIGHTS

- Carrageenan bioadditives positively modified properties of earthen construction.
- Increments in compressive strength of up to 85% were observed in admixture samples.
- Tensile strength was increased up to 52% according to three-point bending tests.
- Water repellence and erosion resistance were enhanced by using coating treatments.
- Admixtures remained water resistant after 95 days of environmental exposure.

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ABSTRACT

Carrageenan, a biodegradable natural polymer, was evaluated as a bioadditive to improve the phy
and mechanical properties of adobe constructions. The results show that its incorporation in the mi
during blocks fabrication, or as a coating in existent earth constructions, positively modify these beh
providing water impermeability and resistance to erosion by water drops. Results of mechanical
also show a considerable enhancement in compressive and tensile strength when the bioadditi
incorporated during the blocks fabrication process. The obtained results show the feasibility of using
ural and eco-friendly compounds to modify the behavior of traditional construction materials.

1. Introduction

The development of modern construction techniques is essential to satisfy the needs of housing for our growing societies. However, given the extensive use of natural resources, the construction sector is accountable for the generation of large quantities of wastes and greenhouse gases [1]. The main cause of this pollution is the production of building materials which require the consumption of high amounts of energy and leave a large carbon print [2,3].

In this context, earthen construction represents an attractive traditional alternative for housing since its embodied energy and carbon dioxide (CO_2) emissions are low. Several authors determined that raw earthen constructions are much less en consuming and do not generate as much equivalent CO_2 as mo materials like concrete or steel [2,4,5]. Additionally, the low of earthen construction and its simple techniques make it an e lent material for massive building, especially in rural areas wh often, neither trained workers nor modern materials are avail [6].

Despite the advantages of earthen constructions, they pre several drawbacks regarding mechanical resistance like poor pressive strength and durability with poor resistance to mois and water attack [6]. From a mechanical point of view, this m rial presents brittle behavior and low resistance to tensile st These facts and the high mass of the resultant buildings, make type of construction system highly vulnerable to seismic ev [7]. As a matter of fact, earthen constructions were severely aged during earthquakes in seismic areas as reported in diffe

* Corresponding author at: Department of Engineering, Civil Engineering Division, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, San Miguel, Lima 32, Peru.
E-mail address: rjaguilar@pucp.pe (R. Aguilar).

New Phytologist — Research

Scale dependence of canopy trait distributions along a tropical forest elevation gradient

Gregory P. Asner[1], Roberta E. Martin[1], Christopher B. Anderson[1], Katherine Kryston[1], Nicholas Vaughn[1], David E. Knapp[1], Lisa Patrick Bentley[2], Alexander Shenkin[2], Norma Salinas[2,3], Felipe Sinca[1], Raul Tupayachi[1], Katherine Quispe Huaypar[4], Milenka Montoya Pillco[4], Flor Delis Ccori Álvarez[4], Sandra Díaz[5], Brian J. Enquist[6,7] and Yadvinder Malhi[2]

[1]Department of Global Ecology, Carnegie Institution for Science, 260 Panama Street, Stanford, CA 94305, USA; [2]Environmental Change Institute, School of Geography and the Environment, University of Oxford, Oxford, OX1 3QY, UK; [3]Sección Química, Pontificia Universidad Católica del Perú, Avenida Universitaria 1801, San Miguel, Lima32, Perú; [4]Universidad Nacional de San Antonio Abad del Cusco, Av. de la Cultura, Nro. 733, Cusco, Perú; [5]Instituto Multidisciplinario de Biología Vegetal (IMBIV), CONICET and FCEFyN, Universidad Nacional de Córdoba, Casilla de Correo 495, 5000 Córdoba, Argentina; [6]Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85721-0001, USA; [7]The Santa Fe Institute, 1399 Hyde Park Road, Santa Fe, NM 87501, USA

Author for correspondence:
Gregory P. Asner
Tel: +1 650 325 1521
Email: gpa@carnegiescience.edu

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Key words: canopy chemistry, Carnegie Airborne Observatory, Peru, plant functional traits, trait distributions, trait scaling.

Summary

• Average responses of forest foliar traits to elevation are well understood, but far less is known about trait distributional responses to elevation at multiple ecological scales. This limits our understanding of the ecological scales at which trait variation occurs in response to environmental drivers and change.

• We analyzed and compared multiple canopy foliar trait distributions using field sampling and airborne imaging spectroscopy along an Andes-to-Amazon elevation gradient. Field-estimated traits were generated from three community-weighting methods, and remotely sensed estimates of traits were made at three scales defined by sampling grain size and ecological extent.

• Field and remote sensing approaches revealed increases in average leaf mass per unit area (LMA), water, nonstructural carbohydrates (NSCs) and polyphenols with increasing elevation. Foliar nutrients and photosynthetic pigments displayed little to no elevation trend. Sample weighting approaches had little impact on field-estimated trait responses to elevation. Plot representativeness of trait distributions at landscape scales decreased with increasing elevation. Remote sensing indicated elevation-dependent increases in trait variance and distributional skew.

• Multiscale invariance of LMA, leaf water and NSC mark these traits as candidates for track-

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Predicting trait-environment relationships for venation networks along an Andes-Amazon elevation gradient

Benjamin Blonder,[1,10] Norma Salinas,[1,2] Lisa Patrick Bentley,[1] Alexander Shenkin,[1] Percy O. Chambi Porroa,[3] Yolvi Valdez Tejeira,[3] Cyrille Violle,[4] Nikolaos M. Fyllas,[1] Gregory R. Goldsmith,[5] Robert E. Martin,[6] Gregory P. Asner,[6] Sandra Diaz,[1,7] Brian J. Enquist,[8,9] and Yadvinder Malhi[1]

[1]*Environmental Change Institute, School of Geography and the Environment, University of Oxford, Oxford, OX1 3QY UK*
[2]*Sección Química, Pontificia Universidad Católica del Perú, San Miguel, Lima, Peru*
[3]*Universidad Nacional de San Antonio Abad del Cusco, Cusco, Peru*
[4]*Centre d'Ecologie Fonctionnelle et Evolutive (UMR 5175), CNRS, Université de Montpellier, Université Paul Valéry Montpellier, EPHE, Monipellier, France*
[5]*Ecosystem Fluxes Group, Laboratory for Atmospheric Chemistry, Paul Scherrer Institute, Villigen, 5232 Switzerland*
[6]*Department of Global Ecology, Carnegie Institution for Science, Stanford, California 94305 USA*
[7]*Instituto Multidisciplinario de Biología Vegetal (IMBIV, CONICET-UNC) and FCEFyN, Universidad Nacional de Córdoba, Cordoba, Argentina*
[8]*Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, Arizona 85721 USA*
[9]*The Santa Fe Institute, 1399 Hyde Park Rd, Santa Fe, New Mexico 87501 USA*

Abstract. Understanding functional trait-environment relationships (TERs) may improve predictions of community assembly. However, many empirical TERs have been weak or lacking conceptual foundation. TERs based on leaf venation networks may better link individuals and communities via hydraulic constraints. We report measurements of vein density, vein radius, and leaf thickness for more than 100 dominant species occurring in ten forest communities spanning a 3,300 m Andes-Amazon elevation gradient in Peru. We use these data to measure the strength of TERs at community scale and to determine whether observed TERs are similar to

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RESEARCH PAPER

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Assessing trait-based scaling theory in tropical forests spanning a broad temperature gradient

Brian J. Enquist[1,2] | Lisa Patrick Bentley[3] | Alexander Shenkin[4] | Brian Maitner[1] | Van Savage[5] | Sean Michaletz[1,6] | Benjamin Blonder[4] | Vanessa Buzzard[1] | Tatiana Erika Boza Espinoza[7] | William Farfan-Rios[8,9] | Christopher E. Doughty[10] | Gregory R. Goldsmith[11] | Roberta E. Martin[12] | Norma Salinas[4,9] | Miles Silman[9] | Sandra Díaz[13] | Gregory P. Asner[12] | Yadvinder Malhi[4]

[1]Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, Arizona
[2]The Santa Fe Institute, Santa Fe, New Mexico
[3]Department of Biology, Sonoma State University, Rohnert Park, California, USA
[4]Environmental Change Institute, School of Geography and the Environment, University of Oxford, Oxford, United Kingdom
[5]Department of Ecology and Evolutionary Biology, University of California, Los Angeles, Los Angeles, California
[6]Earth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos, New Mexico
[7]Institute of Systematic and Evolutionary Botany, University of Zurich, Zurich, Switzerland
[8]Department of Biology, Wake Forest University, Winston Salem, North Carolina
[9]Sección Química, Pontificia Universidad Católica del Perú, San Miguel, Lima, Perú
[10]School of Informatics, Computing, and Cyber Systems, Northern Arizona University, Flagstaff, Arizona
[11]Ecosystem Fluxes Group, Laboratory for Atmospheric Chemistry, Paul Scherrer Institute, Villigen, Switzerland
[12]Department of Global Ecology, Carnegie Institution for Science, Stanford, California
[13]Instituto Multidisciplinario de Biología Vegetal (IMBIV, CONICET-UNC), and FCEFyN, Universidad Nacional de Córdoba, Córdoba, Argentina

Correspondence
Brian J. Enquist, Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85721, U.S.A.
Email: benquist@email.arizona.edu

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Abstract

Aim: Tropical elevation gradients are natural laboratories to assess how changing climate can influence tropical forests. However, there is a need for theory and integrated data collection to scale from traits to ecosystems. We assess predictions of a novel trait-based scaling theory, including whether observed shifts in forest traits across a broad tropical temperature gradient are consistent with local phenotypic optima and adaptive compensation for temperature.

Location: An elevation gradient spanning 3,300 m and consisting of thousands of tropical tree trait measures taken from 16 1-ha tropical forest plots in southern Perú, where gross and net primary productivity (GPP and NPP) were measured.

Time period: April to November 2013.

Major taxa studied: Plants; tropical trees.

Methods: We developed theory to scale from traits to communities and ecosystems and tested several predictions. We assessed the covariation between climate, traits, biomass and GPP and NPP. We measured multiple traits linked to variation in tree growth and assessed their frequency distributions within and across the elevation gradient. We paired these trait measures across individuals within 16 forests with simultaneous measures of ecosystem net and gross primary productivity.

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Selective adsorption of Pb^{2+}, Cr^{3+} and Cd^{2+} mixtures on activated carbons prepared from waste tires

Antonio Nieto-Márquez[a,*], Angela Pinedo-Flores[b], Gino Picasso[c], Evangelina Atanes[a], Rosario Sun Kou[b]

[a]*Department of Mechanical, Chemical and Industrial Design Engineering, ETSIDI, Technical University of Madrid (UPM), Ronda de Valencia 3, 28012, Madrid, Spain*
[b]*Department of Sciences, Section Chemistry, Pontifical Catholic University of Peru, 1801 Av. Universitaria, San-Miguel, Lima 32, Peru*
[c]*Laboratory of Physical Chemistry Research, Faculty of Sciences, National University of Engineering, Tupac Amaru 210 Av. Rimac, Lima 25, Peru*

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ABSTRACT

Heavy metal cation mixtures constitute a critical issue facing water treatment. Among available technologies, adsorption is here presented as a selective and effective technology. With this purpose, two adsorbents have been prepared by chemical activation of discarded tires, which in turn, constitutes the valorization of a residue from the automotive industry. Two different activating agents:zinc ratios by weight (1:1 and 4:1) were employed, and the activated carbons obtained, namely AC-1 and AC-4, were characterized with Scanning Electron Microscopy (SEM), N_2 adsorption-desorption, acid-base titrations, determination of pH_{pzc} and Temperature Programmed Decomposition (TPD). Different textural and acid–base properties were revealed upon different activation conditions, obtaining higher surface area, microporosity and surface acidity for AC-4. The sample AC-1, with lower surface area, consistently led to higher adsorption values for the three cations (Pb^{2+}, Cr^{3+}, Cd^{2+}), indicating that the amount adsorbed was rather governed by type of surface groups present in the adsorbent under the conditions tested. Regarding the amount adsorbed, the sequence $Pb^{2+} > Cr^{3+} > Cd^{2+}$ was measured in individual and mixing conditions, independently of the carbon, and adsorption equilibrium and kinetics were fitted to different models, being Langmuir and pseudo-second order equations the models that better reproduced the equilibrium and kinetic data, respectively.

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SEM-EDS Study of Ionically Crosslinked Alginate and Alginic Acid Bead Formation

Jorge Ayarza, Yves Coello & Javier Nakamatsu

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Modulating antioxidant activity and the controlled release capability of laccase mediated catechin grafting of chitosan

Suyeon Kim[a,*], Katherinne Isabel Requejo[b], Javier Nakamatsu[b], Karen N. Gonzales[c], Fernando G. Torres[c], Artur Cavaco-Paulo[d]

[a]*Engineering Department, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, Lima 32, Lima, Peru*
[b]*Science Department, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, Lima 32, Lima, Peru*
[c]*Department of Mechanical Engineering, Pontificia Universidad Católica del Perú PUCP, Av. Universitaria 1801, Lima 32, Lima, Peru*
[d]*Centre of Biological Engineering, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal*

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ABSTRACT

Laccase from ascomycete *Myceliophthora thermophila* was used for the oxidation and grafting of catechin (CA) and chitosan (CS). The enzymatic grafting of CA into CS resulted in the improvement of natural properties of chitosan films. The successful grafting of CA to CS was supported by UV–vis and Fourier transform infrared (FT-IR) spectroscopies. The differences in the molecular weight and the degree of deacetylation of the CS affected on the enzymatic grafting rate and thus on the film properties like swelling behaviour, erosion rate, thermal property, tensile strength and breaking strain. The CS films prepared by enzymatic grafting presented high antioxidant activity compared to native CS films. The controlled release profiles of methylene blue and coomassie brilliant blue dye, having different acidity/basicity properties, loaded films were also studied with different release medium. The types of molecule loaded into films, the preparation manner of films and the release medium were decisive parameters affecting the release rate.

1. Introduction

Biological polysaccharides are receiving a growing interest for the antioxidant and antimicrobial functionalisation of materials in food processing, treatment of fibres and medical/pharmaceutical applications [1–3]. Among the various polysaccharides, chitosan is currently the most studied for wound healing and controlled drug carrying materials with diverse forms such as films, beads, gels, scaffolds and nanoparticles. This is due to chitosan's unique properties of biodegradability, antibacterial activity, non-inflammatory property, non-toxicity, non-antigenic and high charge density [2–4]. Chitosan is composed of 2-amino-2-deoxy-D-glucose (with free amino groups) and 2-acetamido-2-deoxy-D-glucose (with acetylated amino groups) units linked through β-(1 → 4) bonds and it is obtained from the alkaline deacetylation of chitin. The properties of chitosan depend mostly on its molecular weight and degree of deacetylation (DDA) [5,6]. The deacetylation of chitosan is a process of hydrolysis of acetamide groups in chitin and normally conducted by severe heterogeneous alkaline treatments due to the resistance of such groups imposed by the trans arrangement of the C2-C3 substituent in the sugar ring [7]. The majority of the biological properties of chitosan is related to its cationic behaviour due to protonation of the amino groups in aqueous acidic solutions. Therefore, the DDA is the most important parameter on the biological activities of chitosan like biodegradability, biocompatibility, mucoadhesion, hemostatic, adsorption enhancer, anticholesterolemic, and antioxidant [6,7].

For wound treatment materials, the reduction potential of reactive oxygen is fundamentally necessary as much as an inhibition capacity to microorganism growth. The reactive oxygen that exists in the pathogenesis of wounds and injuries causes oxidative damages to proteins, nucleic acid, lipids as well as the depletion of mitochondrial DNA from human skin [8–10]. Chitosan has been reported as an effective antimicrobial agent showing high inhibition rate against to the microorganism growth [3]. Chitosan possess an antioxidant function but its activity level is very poor due to the lack of a H-atom donor to serve as a good chain breaking antioxidant, especially in the case of medium and high molecular weights

* Corresponding author at: Engineering Department, Pontificia Universidad Católica del Perú, Av. Universitaria 1801, Lima 32, Peru.
E-mail addresses: akim@pucp.pe (S. Kim), kirequerjo@gmail.com (K.I. Requejo), javier.nakamatsu@pucp.pe (J. Nakamatsu), kareno3102@gmail.com (K.N. Gonzales), fernando.g.torres@gmail.com (F.G. Torres), artur@deb.uminho.pt (A. Cavaco-Paulo).

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