

Conference Abstracts and Presentations

Del Valle I, Webster TM, Masiello CA, Silberg JJ and Lehmann J 2019 Using synthetic biology to understand flavonoid bioavailability in soils. Soil Ecology Society meeting (SES), Toledo, Ohio.

Enders A, Lehmann J and Chintala R 2019 Feasibility assessment of dairy biochar as a value-added potting mix in horticulture and ornamental gardening. Soil Science Society of America, Annual Meeting, San Diego, CA, Abstract 144-1

Heuvelink Gerard B.M., Laura Poggio, Marcos E. Angelini, Zhanguo Bai, Niels H. Batjes, Rik van den Bosch, Deborah Bossio, Johannes Lehmann, Ariadna Martinez, Guillermo F. Olmedo, Pablo Pareja and Jonathan Sanderman 2019 Space-time mapping of soil organic carbon concentration and stock to support land degradation neutrality and climate mitigation policies. Wageningen Soil Organic Matter Conference, Number 265

Inagaki TM, Grant K, Mueller CW, Lehmann J, Derry LA and Kögel-Knabner I 2019 Soil organic matter stabilization in top and subsoil. EGU Annual Meeting, Vienna, EGU2019-9929, X1.249

Lehmann J and Possinger A 2019 How nano is micro? Soil Science Society of America, Annual Meeting, San Diego, CA, Abstract 144-1

Possinger A, Bailey SW, Inagaki T, Kögel-Knabner I and Lehmann J 2019 Soil organic matter stabilization via mineral interactions in forest soils with varying saturation frequency. Soil Science Society of America, Annual Meeting, San Diego, CA, Abstract 144-4

Inagaki TM, Grant K, Mueller CW, Lehmann J, Derry LA and Kögel-Knabner I 2018 Mechanisms for SOC stabilization in a Volcanic Andosol: topsoil vs subsoil. In: European Geosciences Union General Assembly 2018, Vienna. Session SSS5.1/CL3.06, Geophysical Research Abstracts, 2018. v. 2018EGUGA..20.3711M.

Inagaki TM, Lehmann J, Kögel-Knabner I, Grant K, Possinger A, Mueller CW, and Derry LA 2018 Holding Carbon in soils: the importance of organomineral interactions. IAS General Assembly, Poster Vol. 20, p. 3711, Technical University Munich, Germany.

Krounbi L, Enders A, Anderton C and Lehmann J 2018 Carbon dioxide-mediated ammonia loading onto pyrogenic waste biomass. American Chemical Society, Annual Meeting, New Orleans, 19-22 March 2018, Abstract ENVR 749.

Lehmann J 2018 Agronomic and Environmental Opportunities of Biochar Systems. IFAD, Rome.

Lehmann J 2018 Soil Organic Matter Formation: Concepts and Controversies. 19th Annual Soil and Water Sciences Research Forum, University of Florida, Gainesville, Florida.

Lehmann J, Krounbi L, Hestrin R, and Enders A 2018 Dairy Manure as a Marketable Fertilizer. New York State Health Summit, Albany.

Lehmann J 2018 Soil organic carbon: Nano-scale stabilization to global-scale climate implications. Georgia Institute of Technology, Atlanta, Georgia. Host: Yuanzhi Tang

Lehmann J 2018 Biochar: Beyond Soil Nutrient and Water Availability. Jimma University, Jimma, Ethiopia. Host: Berhanu Belay

Lehmann J 2018 The status of biochar research: Recent advances and barriers to deploying biochar amendments in agricultural soils. USDA ARS Biochar Roadmap, Chicago, Illinois.

Lehmann J 2018 Biochar Systems Research in Small-holder Agriculture in the Tropics. CIFAD and MOIST seminar, Cornell University, Ithaca

Lehmann J, Krounbi L, Hestrin R 2018 Nitrogen upcycling of wastes to fertilizers using biochar technology. Indonesian Soil Research Institute (ISRI), Bogor, Indonesia.

Lehmann J, Hestrin R, DeCiucies S, Woolf D, Sun T and Whitman T 2018 Pyrogenic carbonaceous matter interactions with inorganic and organic carbon and nitrogen. American Chemical Society, Annual Meeting, New Orleans, 19-22 March 2018, Abstract ENVR 747.

Beem-Miller J and Lehmann J 2017 Subsoil carbon accumulation on an arable Mollisol is retention dominated, in contrast to input driven carbon dynamics in topsoil. European Geosciences Union, Annual Meeting, Vienna, Austria, EGU2017-11321

Hestrin R and Lehmann J 2017 Nitrogen Cycling in the Mycorrhizosphere: Multipartite Interactions and Plant Nitrogen Uptake Vary with Fertilization Legacy. American Geophysical Union AGU, Annual Meeting, 11-15 December 2017, New Orleans AL, Abstract No. B14B-01

Inagaki TM, Grant K, Mueller CW, Lehmann J, Derry LA and Kögel-Knabner I 2017 Distinctive soil organic matter composition in a precipitation contrast of a Hawaiian Andosol. In: European Geosciences Union General Assembly 2017, Vienna. Geophysical Research Abstracts, 2017. v. 19.

Inagaki TM, Grant K, Mueller CW, Lehmann J, Derry LA and Kögel-Knabner I 2017 Distinct soil organic matter properties across a Fe and rainfall gradient. In: Goldschmidt, 2017, Paris - France. Goldschmidt 2017. Houten - Netherlands: European Association of Geochemistry, 2017. v. 1. p. 0-0

Inagaki TM, Grant K, Mueller CW, Lehmann J, Derry LA and Kögel-Knabner I 2017 Contrasting soil organic matter properties of a Hawaiian Andosol revealed by fractionations procedures. In: Jahrestagung der Deutschen Bodenkundlichen Gesellschaft, 2017, Göttingen - DE. Jahrestagung der Deutschen Bodenkundlichen Gesellschaft, 2017. v. 1. p. 25-25.

Jauss V, Sullivan P, Lehmann J, Sanderman J and Daub M 2017 Alternative modelling approaches for estimating pyrogenic carbon, soil organic carbon and total nitrogen in contrasting ecoregions within the United States. European Geosciences Union, Annual Meeting, Vienna, Austria, EGU2017-497

Kleber M and Lehmann J 2017 Science, Language and Society: the case of the "humic substances". ASA-CSA-SSSA Annual Meeting, Tampa, FL

Lehmann J 2017 Climate-smart soils, Institute for Advanced Studies, TU Munich, Germany

Lehmann J 2017 Persistence of biochars for long-term soil fertility improvements and GHG emission reductions. B4SS Workshop, Hanoi, Vietnam,

Lehmann J 2017 The Slow Death of Soil Humus. University of Bayreuth, Germany

Lehmann J 2017 Carbon Farming and Biochar Systems. Carbon Farming and Biochar Workshop, Saturday May 20, 2017

Lehmann J and Solomon D 2017 Soil organic carbon sequestration and food security, UNFCCC Press Conference, Bonn, Germany

Lehmann J and Woolf D 2017 Biochar Systems as Options for Carbon Dioxide Removal, US National Academy of Science Expert Workshop, Colorado State University, Host: Keith Paustian

Lehmann J, Woolf D, DeCicci S, Webster T and Whitman T 2017 Microbial-based SOM modeling of priming and carbon stabilization. 6th International Symposium on Soil Organic Matter, 3-7 September 2017, Harpenden, Rothamsted Research, UK, Oral Presentation Abstract O-2b.03

Lehmann J, Possinger A, Wilhelm R, Webster T, Buckley D, Muller D, Grant K, Derry L, Inagaki T, Müller C and Kögel-Knabner I 2017 How nano is micro? Workshop on Formation, Properties and Function of Soil Microaggregates, Innovation Center, Munich

Lehmann J, Possinger A, Webster T, Buckley D, and Muller D 2017, Soil aggregation as a scale-dependent process to stabilize organic matter. Goldschmidt Conference, Paris, France, 11I: 004

Liang B, Weng YT, Wang CC, Chiang CC, Liu CC and Lehmann J 2017 Interplay between black carbon and minerals contributes to long term carbon stabilization and mineral transformation. American Geophysical Union AGU, Annual Meeting, 11-15 December 2017, New Orleans AL, Abstract No. B41D-1978

Possinger AR, Zachman MJ, Enders A, Levin B, Fitting-Kourkoutis L, Muller DA, Lehmann J 2017 Nanoscale characterization of mineral-organic interfaces in soil using cryogenic microscopy and spectroscopy. 6th International Symposium on Soil Organic Matter, 3-7 September 2017, Harpenden, Rothamsted Research, UK, Oral Presentation Abstract O-3a.03

Possinger AR, Bailey SW, Inagaki T, Koegel-Knabner I and Lehmann J 2017 Soil organic matter stabilization via mineral interactions in forest soils with varying saturation frequency. American Geophysical Union AGU, Annual Meeting, 11-15 December 2017, New Orleans AL, Abstract No. B41D-1971

Smith P, Lehmann J, Robertson P, Paustian K and Reay D 2017 Negative emissions from soils: the role of soils in meeting the Paris Agreement targets. EGU2017-97

Solomon, D., Woolf, D., Jirka, S., Bluhm, D. and Lehmann, J. Land-based food security interventions can deliver both climate-change mitigation and adaptation benefits in SSA: Lessons from Ethiopia's Productive Safety Net Program. Co-hosted by the Agriculture Global Practice and the Social Protection Global Practice of The World Bank Group. Washington DC, USA

Sun T, Levin B, Guzman J, Enders A, Muller D, Angenent L and Lehmann J 2017 The Biosnorkel Mechanism—Direct Extracellular Electron Transfer by Pyrogenic Carbon. American Chemical Society, Annual Meeting, San Francisco, April 2-6, 2017.

Woolf D, Lehmann J, DeCiucies S and Whitman, T 2017 Microbes, minerals, and soil organic matter interactions: Mechanisms and Models. NIFA Project Director Annual Meeting, Tampa FL

Woolf D and Lehmann J 2017 Pathways to Carbon-Negative Liquid Biofuels. American Geophysical Union AGU, Annual Meeting, 11-15 December 2017, New Orleans AL, Abstract No. GC53B-0882

DeCiucies S, Whitman T, Woolf D, Lehmann J, Mahowald N, Hess N and Zihua H 2016 Priming of native soil organic matter by pyrogenic organic matter: Investigating the dilution mechanism. Abstract B41D-0465, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Del Valle I, Webster T, Cheng HY, Silberg JJ, Masiello CA and Lehmann J 2016 In-situ Monitoring of Plant-microbe Communication to Understand the Influence of Soil Properties on Symbiotic Biological Nitrogen Fixation. Abstract B41E-0484, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Hestrin R, Harrison M and Lehmann J 2016 Soil Microbial Communities and Gas Dynamics Contribute to Arbuscular Mycorrhizal Nitrogen Uptake and Transfer to Plants. B41E-0479, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Lehmann J 2016 Biochar-Microbe Interactions: Harnessing Soil Biota. Asia Pacific Biochar Conference, 19-22. October 2016, Kangwon National University, Chuncheon, Gangwon Province, Korea.

Lehmann J 2016 Soil organic matter: concepts and controversies. Soil Science Departmental Seminar, 20. April 2016, University of Wisconsin, Madison WI.

Lehmann J 2016 Biochar soil effects. Biochar and Green Technology Seminar. 16-18. October 2016, Nanjing Agricultural University, Nanjing, China.

Lehmann J 2016 Biochar Biogeochemistry and Systems: From Nano to Global Scale. 15. April 2016, Cornell University, Ithaca.

Lehmann J 2016 Terra Preta de Indio – pre-historic curio or future landuse model?. Sustainability Perspectives Seminar Series, Center for Sustainability and the Environment, 11. April 2016, Wells College, Ithaca. Host: Marian Brown.

Lehmann J 2016 COP21: Reflections on the Historic Climate Agreement. 3. February 2016, Tompkins Country Library, Ithaca. Host: Barbara Lifton

Lehmann J 2016 COP21 Reflections. 13. April 2016, Ithaca College, Ithaca. Host: Sean F. Reid

Lehmann J 2016 International Biochar Initiative (IBI): an international network in a changing environment. International Workshop on Biochar Systems for Africa, 1-2. March 2016, ICRAF, Nairobi, Kenya. Host: Alessandro Peressotti

Lehmann J 2016 Environmental and agronomic benefits of biochar systems: Kenya case studies. International Workshop on Biochar Systems for Africa, 1-2. March 2016, ICRAF, Nairobi, Kenya. Host: Alessandro Peressotti

Lehmann J and Solomon D 2016 Climate-smart agriculture in Africa. UNFCCC COP22, Africa Pavilion, 6-18 November 2016, Marrakech, Morocco.

Lehmann J, Belay B, Blalock G, Karanja N, Neufeld H and Solomon D 2016 Environmental and Agronomic Opportunities of Biochar Systems: Case studies from Africa. 30. September 2016, EIAR, Addis Abeba, Ethiopia.

Lehmann J, DeCuicies S, Woolf D, Whitman T, Zihua H and Hess N 2016 Soil Organic Carbon Interactions with Organic Matter Additions: Mechanisms and Models, NIFA PD Meeting, 17-18 December 2016, San Francisco.

Lehmann J, Jauss V, Ahmed Z, Sullivan P, Sanderman J and Woodbury P 2016 Pyrogenic carbon distribution in landscapes and input to aquatic systems. Abstract B22C-03, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Lehmann J, Belay B, Blalock G, Karanja N, Neufeld H and Solomon D 2016 Environmental and Agronomic Benefits of Biochar Systems: Case studies from Sub-Saharan Africa. Joint Workshop of the BGR and Jimma University, 14.-15. June 2016, Jimma, Ethiopia.

Lehmann J, Woolf D and Solomon D 2016 Getting Climate Smart: Carbon Sequestration in Soil. UNFCCC COP22, Climate-Studio, 6-18 November 2016, Marrakech, Morocco.

Possinger A, Zachman M and Lehmann J 2016 Effects of Dissolved Organic Matter Properties on Formation and Composition of Mineral-Organic Co-Precipitates at the Nanometer Scale. Abstract B41D-0450, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Solomon D, Belay B, Blalock G, Nesin B, Ahmed M, Ambaw G, Ancha V and Lehmann J 2016 Biochar-based climate-smart agriculture pilot initiative in Ethiopia: motivations achievements and strategy. 30. September 2016, EIAR, Addis Abeba, Ethiopia.

Webster T, Kessler A, Thies J and Lehmann J 2016 Soil mineral and organic matter influences on the signaling between nitrogen-fixing bacteria and legumes. International Symposium for Microbial Ecology, August 21-26, 2016, Montreal Canada.

Woolf D and Lehmann J 2016 Persistence of Soil Organic Carbon can be Explained as an Emergent Property of Microbial Ecology and Population Dynamics. Abstract B22B-02, AGU Annual Meeting, 12-15 December 2016, San Francisco.

Clancy T, Thies J, and Lehmann J 2015 Improving biological nitrogen fixation by understanding the effects of biochar on plant-microbe signaling. Association of Environmental Engineering and Science Professors, Yale University, 13-16 June 2015, New Haven

DeCuicies S, Dharmakeerthi S, Whitman T, Woolf D and Lehmann J 2015 Priming of native soil organic matter by pyrogenic organic matter. European Geosciences Union Annual Meeting, Vienna, 12-17 April 2015, Geophysical Research Abstracts Vol. 17, EGU2015-7968

Lehmann J, Mahowald N, Woolf D, Whitman T, Hess N, and DeCuicies S 2015 Soil Organic Carbon Interactions with Organic Matter Additions: Mechanisms and Models, NIFA PD Meeting, 8-10 April 2015, Washington DC.

Hestrin R and Lehmann J 2015 Influence of soil microbial communities on arbuscular mycorrhizal nitrogen uptake and transfer to plants. Soil Ecology Society Biannual Meeting, 8-12 June 2015, Rutgers University, p 55

Whitman T, Pepe-Ranney C, Koechli C, Campbell A, Buckley D, and Lehmann J 2015 Pyrogenic and fresh organic matter effects on soil carbon and soil microbial communities. Soil Ecology Society Biannual Meeting, 8-12 June 2015, Rutgers University, p 114

Heckman K, Swanston C, Krull E and Lehmann J 2014 Isolation and characterization of the most "recalcitrant" organic matter fraction in a Spodosol and a Vertisol. SSSA-ASA-CSA Meeting, Long Beach, CA

Lehmann J 2014 Fertilizers and the Sustainability of Subsistence Agriculture in Developing Countries. SSSA-ASA-CSA Meeting, Long Beach, CA

Lehmann J 2014 Biochar Systems: Climate Mitigation and Soil Fertility Management. California Department of Food and Agriculture, ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL, California Department of Food and Agriculture, Sacramento, CA

Lehmann J 2014 Managing diversity in biochar properties: From material properties to products. Webinar, International Biochar Initiative

Lehmann J 2014 Biochar Systems: Opportunities and Risks. The World Bank, Washington DC

Lehmann J 2014 Biochar: Material – Product – System. Sanergy, Nairobi, Kenya

Lehmann J 2014 Pyrogenic Carbon in soil: what can we learn for biochar management? Colorado State University, Seminar Series

Lehmann J, Simons A, Blalock G, Solomon D, Bluhm D, Zwetsloot M, Hestrin R and Belay B 2014 Beyond vs within the farm gate: Nutrient and organic matter solutions to resource-constrained agriculture in Africa. World Congress of Soil Science, Jeju Island, South Korea

Lehmann J 2014 Biochar systems at household scale. University of Sydney, Sydney, Australia

Solomon D, Lehmann J, Fraser JA, leach M, Amanor K, Frausin V, Kristiansen SM, Millimouno D and Fairhead J 2014 Deep and persistent soil carbon enrichment in African homegardens. Soil Organic Matter Conference, Kiawah Island, PA

Lehmann J 2014 Biochar for Environmental Management: From Science and Implementation. Leibniz Institute, Berlin, Germany

Krounbi L, Enders, A, Lehmann J and van Es H 2014 Biochar from slum latrine urban waste for enhanced soil fertility in Kenya. 2014 SSSA-ASA-CSA Meeting, Long Beach, CA

Fujiu M, Plante A, Lehmann, Solomon D (2014) Characterization of extractable soil organic matter pools from African Dark Earths (AfDE): A case study in historical biochar and organic waste amendments. EGU Vienna. EGU2014-12886

Plante A, Fujiu M, Ohno T, Solomon D, Lehmann J, Fraser J, Leach M, Fairhead J 2014 Characterization of soil organic matter from African Dark Earth (AfDE) soils. AGU, San Francisco

Woolf D and Lehmann J (2014) Cross-scale modelling of the climate-change mitigation potential of biochar systems: Global implications of nano-scale processes. EGU Vienna.

Bayabil HK, Lehmann J, Yitaferu B, Stoof C and Steenhuis TS 2013 Effects of Biochar and Charcoal on Moisture Retention Characteristics of Agricultural Soils and Its Implication on Soil and Water Management in the Ethiopian Highlands. International Water Management Institute (IWMI) Conference, July 2013, Addis Ababa, Ethiopia

Cayuela M, Sanchez-Monedero MA, Roig A, Hanley K, Enders A, Lehmann J 2013 How do biochar characteristics influence its capacity to mitigate N₂O emissions in agricultural soils? RAMIRAN, 15th International Conference, Versailles, France

Lehmann J, Vanek S, Guerena D, Zweetslot M and Thies J 2013 Biochar systems: integrated nutrient delivery and microbial management. First Mediterranean Biochar Conference, Como, Italy

Lehmann J 2013 Biochar: Fan, Fad, Foe. North American Biochar Conference, University of Massachusetts, Amherst.

Lehmann J 2013 Biochar: Science and Application. Joint Research Center, European Union, Ispra, Italy

Whitman T, Lehmann J 2013 Priming of soil organic matter by biochar. North American Biochar Conference, University of Massachusetts, Amherst.

Hestrin R, Lehmann J 2013 Composting with biochar. North American Biochar Conference, University of Massachusetts, Amherst.

Whitman T, Enders A, Lehmann J 2013 Pyrogenic carbon is offsetting the priming by plants. Soil Ecology Conference

Whitman T and Lehmann J 2013 Interactions between pyrogenic C, soil organic C, and plant root C: A field study. AGU, San Francisco.

Amonette JE, Woolf D, Street-Perrott FA, Lehmann J, Joseph S 2012 Mitigation of Climate Change With Biomass: Technical Potentials and Factors Affecting Implementation. 11th Annual Conference on Carbon Capture Utilization & Sequestration, April 30 - May 3, 2012 Pittsburgh, Pennsylvania

- Cayuela, M.L., Sanchez-Monedero, M.A., Roig, A., Hanley, K., Enders, A., and Lehmann, J.C. 2012 Biochar and denitrification in agricultural soils: when, how much and why do biochar reduce N₂O emissions? IBI Beijing.
- Guerena D, Lehmann J, Thies J and Neufeldt H 2012 Biochar as a mechanism for improving nodulation, biological N fixation, and plant responses in common bean. Integrated Soil Fertility Management conference, October, Nairobi, Kenya
- Hestrin R, Lehmann J, Belay B, Nigussie A, Ambaw G 2012 Nitrogen retention during composting with biochar. Integrated Soil Fertility Management conference, October, Nairobi, Kenya
- Lehmann J 2012 Biochar and nutrient cycling. Wageningen University, The Netherlands
- Lehmann J, Heymann K, Solomon D, Chia C, Munroe P, Joseph S, and Muller D 2012 Interface studies between minerals and organic carbon. Monte Verita, Lugano, Switzerland
- Lehmann J 2012 Biochar for environmental management: issue and opportunities. Environmental Sciences Series, Ithaca College, Ithaca NY
- Lehmann J, Vanek S, Guerena D, Thies J, Neufeldt H 2012 Biochar effects on plant-microbe interactions. ASA-SSSA-CSA meeting, Cincinnati OH
- Lehmann J 2012 Biochar: what the h*** is it and why bother? Department of Horticulture, Cornell University, USA
- Lehmann J 2012 Connecting biochar properties with biochar processes in soil. 4th International Biochar Conference, Beijing, China
- Lehmann J 2012 Biochar: From science to product. McGill University, Montreal, Canada
- Lehmann J 2012 Biochar and carbon sequestration in temperate soils. Environment Commissioner of Ontario, University of Guelph, Canada
- Lehmann J, Roberts K, Woolf D and Whitman T 2012 Biochar for climate change mitigation in perspective. Third US Biochar Conference, Sonoma, CA
- Lehmann J 2012 Agriculture, carbon sequestration and soil fertility in Africa. Scientific and Technical Advisory Panel, Global Environmental Facility, UNEP, Nairobi, Kenya
- Lehmann J 2012 Agricultural carbon sequestration and emission reductions: challenges & opportunities. AAAS, Vancouver, BC, Canada
- Vanek S, Lehmann J and Nason S 2012 Bean-mycorrhizal symbioses and crop phosphorus nutrition as affected by phosphorus type and spatial relation to biochar. Integrated Soil Fertility Management conference, October, Nairobi, Kenya
- Woolf D and Lehmann J 2012 Priming of soil carbon by black carbon. ASA-SSSA-CSA meeting, Cincinnati OH
- Zweetslot M, Lehmann J and Solomon D 2012 Phosphorus chemistry in bone and wood char. ASA-SSSA-CSA meeting, Cincinnati OH
- Whitman T and Lehmann J 2012 Black carbon effects on soil carbon. ASA-SSSA-CSA meeting, Cincinnati OH
- Whitman T and Lehmann J 2012 Black Carbon Effects On Soil CO₂ Emissions and Isotopic Proxies for Black Carbon Decomposition: A Methodological Study. Canadian Soil Science Society, Annual Meeting, June, Quebec
- Domene X, Marks EAN, Lehmann J 2011 Effects of different biochars and their corresponding feedstocks on reproduction and survival of the collembolan *Folsomia candida*. Society of Environmental Toxicology and Chemistry, Milan, Italy
- Domene X, Marks EAN, Lehmann J 2011 In-field evaluation of effects of biochar on soil properties and functions. Society of Environmental Toxicology and Chemistry, Milan, Italy
- Jauss V, Lehmann J, Krull E, Solomon D, Foereid B 2011 Black carbon stocks in the United States. NACP Annual meeting, Jan 31- Feb 4 2011, New Orleans, USA.
- Lehmann J 2011 Biochar science: progress and hurdles to adoption. Third Annual UK Biochar Conference, May 24-27 2011, UKBRC, Edinburgh, UK
- Lehmann J 2011 Carbon-negative interventions: Agricultural carbon. Second Asia Pacific Biochar Conference, September 15-18, Kyoto, Japan
- Lehmann J 2011 Capturing relevant biochar properties: current status and advances at the Kyoto meeting. Biochar-Green Agriculture Conference, September 20-24, Nanjing, China
- Lehmann J, Solomon D, Muller D, Chia C, Xin H, Joseph S, Monroe P 2011 Functional group chemistry at the mineral-organic interface. Goldschmidt Conference, August 14-18 2011, Prague, Czech Republic

Schneider MPW, Lehmann J, Schmidt MWI 2011 Charcoal molecular marker quantity and pattern do not change over a century in a tropical climate. Session BG1.6/SSS4.6: "Stabilization of organic matter in soils, sediments and marine dissolved organic matter". EGU, Vienna.

Thies J, Vanek S, Su J, Lehmann J 2011 Biochar as an inoculant carrier. ASA Meeting San Antonio, TX, October 17-19 2011

Whitman T, Lehmann J 2011 Priming of soil organic matter decomposition by black carbon. ASA Meeting San Antonio, TX, October 17-19 2011

Enders A, Lehmann J 2010 Analysis of total nutrients in biochar. Third IBI Conference, Rio de Janeiro, Brazil.

Guerena D, Lehmann J, Hanley K, Enders A, Riha S 2010 Nitrogen use efficiency of maize after biochar additions to a temperate soil. Third IBI Conference, Rio de Janeiro, Brazil.

Hale S, Arp HP; Elmquist M; Henriksen M; Hartnik T; Lehmann J; Hanley K; Cornelissen G 2010 Sorption of pyrene to biologically, chemically and physically altered black carbons with and without soil. ENVR195, Presentation at the American Chemical Society Meeting, August 2010, Boston.

Hanley K, Lehmann J, Enders A, Guerena D, Duxbury J, Hyland C 2010 Nitrous Oxide Emissions From Biochar-Amended Agronomic Soils. Third IBI Conference, Rio de Janeiro, Brazil.

Joseph SD, Camps-Arbestain M, Lin Y, Munroe P, Chia CH, Hook J, van Zeeuwen L, Kimber S, Cowie A, Singh BP, Lehmann J, McGlashen S, Foidl N, Blackwell P, Donne S, Thomas P and Henderson R 2010 Development of a biochar mineral complexes; the next generation of plant effective biochars. Biochar Workshop, Feb 11-12, 2010, New Zealand Biochar Research Centre, Massey University, New Zealand

Krull E, Kookana R, Smernik R, McBeath A, Jahanshahi S, McGowan J, Donne S, Lehmann J 2010 : Agronomic and environmental implications of biochar sourcing, production and application. Third IBI Conference, Rio de Janeiro, Brazil.

Lehmann J, Enders A, Hanley K, Joseph S 2010 Biochar properties and classification. Third IBI Conference, Rio de Janeiro, Brazil.

Lehmann J, Guerena D, Hanley K, Enders A, Hyland C, Rajkovich S 2010 Environmental effects of biochars from agricultural wastes – Biochar Properties. ASA Annual Meeting, Long Beach, CA.

Lehmann J, Whitman T, Hanley K, Rajkovich S, Hyland C, Enders A 2010 Biochar Properties Significantly Affect Agronomic and Environmental Performance. Second North American Biochar Conference, Iowa State University, Ames, Iowa

Mao J, Lehmann J, Olk DC, Johnson RL, Schmidt-Rohr K 2010 Characterization of Char Residue in Terra Preta Soils by Solid-State NMR. Geological Society of America Annual Meeting, Denver CO.

McBeath A, Smernik R, Schneider M, Schmidt M, Lehmann J 2010 Black Carbon in all its Shades of Grey: Aromatic condensation as a measure of black carbon stability: An NMR study. Fourth Conference on Soil Organic Matter Stabilization, France

Moebius-Clune B, van Es H, Robert Schindelbeck, Frederick Magdoff, Johannes Lehmann, Janice Thies 2010 Today's Students, Tomorrow's Land Managers and Policy Makers: Teaching Sustainable Soil Management by Integrating Chemical, Physical and Biological Considerations in Theory and Practice. ASA

Schneider M, Lehmann J and Schmidt MWI 2010 Can we use molecular markers to trace quality changes in chars from a soil chronosequence? EGU, Vienna.

Solomon D, Lehmann J, Heymann K, and Harden J 2010 . Nano-scale spatial biogeocomplexity of organomineral assemblages using NEXAFS Spectromicroscopy. International Conference on Organic matter stabilization and ecosystem functions, 19 to 23 September 2010 - Presqu'île de Giens (Côte d'Azur), France, p 74

Torn MS, M.W.I. Schmidt, S. Abiven, T. Dittmar, G. Guggenberger, I. Janssen, M. Kleber, I. Kögel-Knabner, J. Lehmann, D.A.C. Manning, P. Nannipieri, D.P. Rasse, S.E. Trumbore, S. Weiner 2010 Soil organic carbon turnover in a changing world. International Conference on Organic matter stabilization and ecosystem functions, 19 to 23 September 2010 - Presqu'île de Giens (Côte d'Azur), France, p 138

Torres D, Lehmann J, Joseph S, Dietz J 2010 Biomass availability, energy consumption and biochar production in rural households of Western Kenya. Third IBI Conference, Rio de Janeiro, Brazil.

Whitman T, Torres D, Nicholson C, Lehmann J 2010 Climate change impact of introducing a biochar cook stove to Western Kenyan farm households: a system dynamics model. Third IBI Conference, Rio de Janeiro, Brazil.

Schneider M, Lehmann J and Schmidt MWI 2009 Wie verändern sich die Muster von molekularen Black Carbon-Markern mit zunehmendem Alter von Verbrennungsrückständen? DBG

Lehmann J 2009 The role of biochar in mitigating climate change, ASA conference, Pittsburgh.

Lehmann J 2009 Biochar for CO₂ bio-sequestration during pyrolysis bioenergy production. Proceedings of the 20090 Empire Fruit and Vegetable Expo, Syracuse, February 10-12 2009, p 122-123

Lehmann J 2009 Biochar: science and policy. 1st Australasia Biochar Conference, Gold Coast, Australia, May 17-20 2009. p x-y.

Lehmann J 2009 Biochar systems for climate change mitigation. 350 Conference, May 21, 2009, Columbia University, New York, USA.

Lehmann J, Heymann K, Nguyen B and Solomon D 2009 Surface interactions of black carbon and soil minerals. Poster Presentation at the European Geosciences Union, EGU, Vienna, Austria

Lehmann J 2009 The role of biochar in mitigating climate change. Annual ASA Conference, Pittsburgh, PA

Lehmann J 2009 Biochar soil management, Annual Meeting of the Brazilian Humic Substance Society, Pelotas, Rio Grande do Sul, Brazil

Lehmann J 2009 Biochar potential for carbon markets. The World Bank, Biocarbon Fund, October 15 2009

Lehmann J 2009 Biochar Systems Science: Climate Change Mitigation with Multiple Sustainability Outcomes? Side event by the European Commission, UNFCCC, COP 15, Copenhagen

Lehmann J 2009 Biochar Systems: Climate Mitigation & Adaptation with Food and Energy Security Benefits. Side event by the International Biochar Initiative and UNCCD, UNFCCC, COP 15, Copenhagen

Lehmann J 2009 Biochar: A Solution to Improve Soils around the World? Annual Conference on Growing the Bioeconomy, Iowa State University, Ames, IA

Lehmann J 2009 Biochar and monitoring of carbon sequestration. USDA Economics Group, Washington DC

Lehmann J 2009 Bringing carbon back into nutrient management. Conference on Going Beyond the Rhetoric: Metrics for Assessing Global Agriculture, Columbia University, New York, NY

Lehmann J 2009 Biochar for sustainable land management. Side event by UNCCD, UNCCD, COP 9, Buenos Aires, Argentina

Lehmann J 2009 Policy implication of biochar. First North American Biochar Conference, Boulder, CO.

Lehmann J and Solomon D 2009 High spatial variability of soil organic matter detected by synchrotron-based spectroscopy. In: International Symposium on Soil Organic Matter Dynamics: Land Use, Management and Global Change. Colorado Springs, CO, USA, July 6-9 2009, page 102.

Heymann K, Lehmann J, Solomon D, Regier T, Baldock J 2009 Quantification of black carbon in soils. Invited Oral Presentation at the European Geosciences Union, EGU, Vienna, Austria

Solomon D, Lehmann J, Harden J, Wirick S and Karunakaran C 2009 Applications of synchrotron-based X-ray spectromicroscopy techniques for understanding the spatial distribution and interactions of organic C, low-Z elements, and other metal ions in intact organomineral assemblages. In: International Symposium on Soil Organic Matter Dynamics: Land Use, Management and Global Change. Colorado Springs, CO, USA, July 6-9 2009, PS2_12, page 148

Amonette JE, Lehmann J, and Joseph S 2008 Biomass carbonization: The dark side of terrestrial carbon sequestration. *Climate Change: Science and Solutions*. 8th National Conference on Science, Policy and the Environment. January 16-18, 2008, Washington, DC. Poster #2163.

Ballantine KA, Schneider RL, Lehmann J and Groffman PM 2008 Ecosystem functions of restored wetlands amended with biochar. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 30

Cheng CH and Lehmann J 2008 Ageing of black carbon along a temperature gradient. In: *American Geophysical Union, Annual Meeting*, 15-19 December 2008, San Francisco, USA. B23D-0474

Gatere L, Delve R, Hobbs P, DeGloria S and Lehmann J 2008 Crop yield with biochar in conservation agriculture along climatic and soil gradients in Zambia. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 30

Heymann K and Lehmann J 2008 Black carbon characterization and quantification. *Canadian Light Source*, Saskatoon, Canada

Heymann K and Lehmann J 2008 Characterization of black carbon using NEXAFS spectroscopy. In: *ASA-SSSA-CSA Annual Meeting*, 5-9 October 2008, Houston, No. 743-2

Jin H, Thies JE and Lehmann J 2008 Soil microbial community response to amending field soils with corn stover biochar. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 31

Johnson M, Lehmann J, Riha S and Couto E 2008 Dynamics of soil CO₂ at storm, diurnal and seasonal scales. In: *Amazon in Perspective: Integrating Science for a Sustainable Future*, LBA Conference, November 17-20 2008, Manaus, Brazil, No. 458

Joseph S, Munroe P, Lin Y, Downie A, Hook J, Shasha A, Van Zwieten L, Kimber S, Cowie A, Singh BP, Lehmann J, Amonette JE and Carter E 2008 Towards an understanding of the properties and structure of high mineral ash biochars. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 23

Joseph S, Munroe P, Lin Y, Neves E and Lehmann J 2008 Examination of different structures in organo-clay microaggregates and possible mechanism for their formation. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 24

Joseph S, Munroe P, Lin Y, Downie A, Hook J, Shasha A, Van Zwieten L, Kimber S, Cowie A, Singh BP, Lehmann J, Hanley K, Blackwell P and Carter E 2008 Development of synthetic terra preta (STP): characterization and initial research findings. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 23

Kimetu J and Lehmann J 2008 Soil organic matter dynamics in Western Kenya. In: *EuroSoil Conference*, August 2008, Vienna, Austria.

Kimetu J and Lehmann J 2008 Food security in sub-Saharan Africa: the role of biochar. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 30

Kimetu J, Lehmann J, Ngoze S, Mugendi DN, Kinyangi J, Riha S, Verchot L, Recha J, Thies J and Pell A 2008 Biochar stability and stabilization as affected by soil degradation and texture. In: *Biochar: Sustainability and Security in a Changing Climate*. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 32

Kimetu J, Lehmann J, Ngoze S, Riha S, Recha J, Thies J, Pell A, Mugendi D, Kinyangi J and Verchot L 2008 Soil organic matter stabilization and land-use change in tropical ecosystems. In: *ASA-SSSA-CSA Annual Meeting*, 5-9 October 2008, Houston, No. 578-6

Lehmann J, Nguyen B, Hanley K and Enders A 2008 Large variability of biochar stability and biochar properties. In: *American Geophysical Union, Annual Meeting*, 15-19 December 2008, San Francisco, USA.

Lehmann J 2008 Stability of black carbon/biochar. In: ASA-SSSA-CSA Annual Meeting, 5-9 October 2008, Houston, No. 666-1

Lehmann J 2008 Biochar for environmentally-friendly bioenergy. In: 30th Symposium on Biotechnology for Fuels and Chemicals, May 4-7 2008, New Orleans. No. 10-03, p 59.

Lehmann J 2008 Biochar for CO₂ bio-sequestration during pyrolysis bioenergy production. In: World Renewable Energy Congress X and Exhibition. 19-25 July 2008, Glasgow, Scotland, No. BM23 p. 18

Lehmann J 2008 Biochar: a new wedge for sustainable emission reductions. UNFCCC, December 1-12 2008, Poznan, Poland

Lehmann J, Hanley K, Hyland C, Rajkovich S, Miller-ter-Kuile E, Cheng CH and Enders A 2008 Crop yield, nutrient uptake and leaching, soil water availability, and nitrous oxide emissions with biochar from different feedstocks and produced at different temperature. In: Biochar: Sustainability and Security in a Changing Climate. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 34

Major J and Lehmann J 2008 Biochar for sustainable soil management. Meeting of the Organic Landscape Association, Massachusetts

Major J, Lehmann J and Rondon M 2008 Biochar application to soil reduces nutrient leaching in the field. In: Biochar: Sustainability and Security in a Changing Climate. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 35

Markewich HA, Pell AN, Mbugua DM, Cherney DJR, van Es HM, Lehmann J and Robertson JB 2008 Degradation of slowly degradable N from manure in storage and manure in soil on small farm systems in Kenya. WCAP

Markewich HA, Pell AN, Mbugua DM, Cherney DJR, van Es HM, Lehmann J and Robertson JB 2008 Effects of storage methods on manure systems and manure decomposition in soil in small-scale Kenyan systems. In: ASA-SSSA-CSA Annual Meeting, 5-9 October 2008, Houston, No. 588-4

Markewich HA, Pell AN, Mbugua DM, Cherney DJR, van Es HM and Lehmann J 2008 Effects of composition and rainfall on the quality of manure from small-scale manure storage systems in Kenya. In: ASA-SSSA-CSA Annual Meeting, 5-9 October 2008, Houston, No. 710-6

Moebius B, van Es H, Idowu O, Schindelbeck R, Kimetu J, Ngoze S, Kinyangi J and Lehmann J 2008 Developing standard protocols for agricultural soil quality monitoring and assessment using a chronosequence in Western Kenya as a case study. In: ASA-SSSA-CSA Annual Meeting, 5-9 October 2008, Houston, No. 595-3

Nguyen B and Lehmann J 2008 Biochar decomposition under different water and temperature regimes. In: Biochar: Sustainability and Security in a Changing Climate. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 36

Sohi S, Yates H, Gaunt J and Lehmann J 2008 Evaluating mechanisms of organic matter-biochar interactions in soil. In: Biochar: Sustainability and Security in a Changing Climate. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 30

Torres D and Lehmann J 2008 Biomass availability, energy consumption, and opportunities for biochar use in rural households of Western Kenya. In: Biochar: Sustainability and Security in a Changing Climate. 2nd Annual International Meeting of the International Biochar Initiative (IBI), September 8-10 2008, Newcastle, UK, p 16

Warnock D, McBride B, Major J, Lehmann J and Rillig M 2008 Non-herbaceous biochars exert neutral to negative influence on arbuscular mycorrhizal fungal abundance. In: ASA-SSSA-CSA Annual Meeting, 5-9 October 2008, Houston, No. 665-2

Lehmann J, Liang B, Sohi, S and Gaunt J 2007 Black Carbon and organic matter stabilization in soil. Annual Meeting of the American Geophysical Union. San Francisco, December 10-14, 2007. B-11g-03, p. 9.

Gaunt J, Hanley K and Lehmann J 2007 Mitigation of Ecosystem Degradation by Bioenergy with Biochar. Environmental Monitoring, Evaluation and Protection: Linking Science and Policy (EMEP). November 15-16, 2007, Albany, NYSERDA. No. ALT 1.

Lehmann J, Solomon D and Heymann K 2007 Nano-scale distribution of nutrient forms in soil microaggregates. Soil Science Society of America, Annual Meeting, New Orleans, November 5-9, 2007. Abstract No. 118-7.

Lehmann J, Cheng CH, Nguyen B, Liang B, Major J, Solomon D, Krull E, Skjemstad JO, Smernik R and Sohi S 2007 Black carbon – changes and fate in soils. Third International Conference on Mechanisms of Organic Matter Stabilisation and Destabilisation in Soils and Sediments. Adelaide, Australia, September 23-26, 2007.

Lehmann J 2007 Pyrolysis and Biochar – Environmentally-friendly Bioenergy. Bio-based Industry Outlook Conference. Iowa State University Center, Ames, Iowa, November 5-6, 2007. p. 23.

Gaunt J and Lehmann J 2007 Prospects for carbon trading based in the reductions of greenhouse gas emissions arising from the use of bio-char. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 20.

Grossman JM, O'Neill BE, McPhillips LE, Tsai SM, Lehmann J and Thies JE 2007 Microbial Ecology of Anthrosols: Assessing Soil Community Diversity of Bacteria, Archaea and Fungi in Amazonian Dark Earths of Brazil. Ecological Society of America, Annual Meeting

Johnson M.S., Lehmann J., Riha S.J., Couto E.G. and Weiler M. (2007). Storm pulses of dissolved CO₂ in a forested headwater Amazonian stream explored using hydrograph separation. Gordon Research Conference: Catchment Science: Interactions of Hydrology, Biology & Geochemistry, July 8-13, New Hampshire, USA.

Joseph S, Downie A and Lehmann J 2007 Classification of chars for agricultural use. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 27.

Kimetu J, Lehmann J, Pell A and Thies J 2007 Carbon sequestration and mitigation of carbon dioxide accumulation in the biosphere: the role of biochar in tropical agricultural systems. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 36.

Lehmann J, Cheng CH, Nguyen B, Liang B, Major J and Smernik R 2007 Permanency and long-term changes of bio-char in soil. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 23.

Major J, Rondon M and Lehmann J 2007 Fate of biochar applied to a Colombian savanna Oxisol during the first and second years. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 34.

Major J, Rondon M and Lehmann J 2007 Field maize yield and yield determining factors for four years following biochar application on a Colombian savanna Oxisol. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 32.

McPhillips L, O'Neill B, Tsai SM, Grossman J, Lehmann J and Thies J 2007 Soil fungal communities in three ADE sites characterized by molecular fingerprinting, isolating unique species, and assessing arbuscular mycorrhizal fungi. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 39.

O'Neill B, Grossman JM, Tsai SM, Lehmann J and Thies JE 2007 Analysis of bacterial communities in Amazonian Dark Earths through community-level molecular analysis and identifying dominant species in soils from the eastern and central Amazon. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 23.

Steiner C, Teixeira WG, Lehmann J, Glaser B, Arruda MR, Zech W and Blum WEH 2007 Slash and char as alternative to slash and burn – soil charcoal amendments maintain soil fertility and establish a carbon sink. International Agrichar Initiative (IAI) 2007 Conference, April 27-May 2 2007, Terrigal, Australia. p. 32.

WARNOCK, D.D., 1 MAJOR, J., 2 LEHMANN, J., 2 MCBRIDE, B., 1 RILLIG, M.C. 1,3 2007 Wood derived biochar negatively influences arbuscular mycorrhizal fungi (AMF) as a function of application rate. SES

Cheng C and Lehmann J 2006 Oxidation of Black Carbon Along a Climosequence. In World Congress of Soil Science, 9-14 July 2006, Philadelphia . Abstract 16584, poster 145-28.

Couto, E. G., João Paulo Novaes Filho, Mark Johnson, Virlei Álvaro de Oliveira, Johannes Lehmann, and Susan Riha. 2006. Spatial variability of soil physical attributes used for soil mapping in headwater catchments of the Southern Amazon. In Second Global Workshop on Digital Soil Mapping for Regions and Countries with Sparse Soil Data Infrastructures, Second Global Workshop on Digital Soil Mapping for Regions and Countries with Sparse Soil Data Infrastructures, Rio de Janeiro, 2006, Rio de Janeiro: International Union of Soil Science /Embrapa (ISBN 85-85864-21-4 2ndGWDSM 2006 Published by Embrapa Solos)

Costa LA , Kern D , Costa ML , Rodrigues TE , Kampf N , Lehmann J and Frazão FJL 2006 Geochemistry of Dark Earth Amazonian. In World Congress of Soil Science, 9-14 July 2006, Philadelphia . Abstract 16645, poster 133-10.

Grossman G , O'Neill B , Gomes JE , Tsai SM , Liang B , Lehmann J and Thies J 2006 Soil Microbial Communities Associated with Anthropogenic Dark Earths (Terra Preta) and Black Carbon Particles. In World Congress of Soil Science, 9-14 July 2006, Philadelphia . Abstract 18501, Poster 133-17

Hyland C , Lan Z , Ketterings Q and Lehmann J 2006 Properties of Phosphorus Forms in Leachate from Soils with Long-Term Manure Additions. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18567, Poster 154-43.

Johnson M.S., E.G. Couto, J. Lehmann, S.J. Riha (2006). Nutrient dynamics in nested catchments at nested time scales: trends in hydrologic exports from 1st and 2nd order watersheds in the seasonally dry Southern Amazon. LBA-ECO 10th Science Team Meeting, Oct 4-6, Brasilia, Brazil. Abstract no. ND-02.

Kinyangi J, Lehmann J, Liang B and Solomon D 2006 Microscale synchrotron-FTIR mapping of carbon 'hot spots' on mineral surfaces in soil. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18557, poster 63-3.

Kinyangi J, Lehmann J, Pell A, Thies J, Ngoze S, Riha S, Mbugua D and Verchot L 2006 Soil organic matter stabilization and associated degradation threshold dynamics. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18131, poster 138-54.

Lehmann J and Sohi S 2006 Bio-char (Black Carbon) Stability and Stabilization in Soil. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 16146, oral presentation 72-1.

Lehmann J, Rondon M, Major J, Kimetu J, Cheng C, Trujillo L, Day D, Liang B, Gaunt J, Sohi S, Solomon D and Luizão F 2006 Terra Preta: Opportunities for Meeting Global Challenges of Soil Degradation and Climate Change. AAAS Annual Meeting, 16-20 February 2006, St. Louis, MI. Booklet p. 117, abstract CD ROM.

Lehmann J, Solomon D and Kinyangi J 2006 Chemical speciation of organic matter on mineral surfaces and in micro-pores using NEXAFS. Soil Science Society of America, Annual Meeting, Indianapolis, November 12-16. Abstract No. 183-4.

Lehmann J, Solomon D and Kinyangi J 2006 In-situ assessment of the spatial association of organic carbon and clay mineral forms in soil. Soil Science Society of America, Annual Meeting, Indianapolis, November 12-16. Abstract No. 119-6.

Liang B , Lehmann J , Kinyangi J , Solomon D , Thies J and Luizão F 2006 Long-Term Oxidation of Biomass-Derived Black Carbon and Effects on Soil Fertility and Organic C Cycling . In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18242, poster 133-15

Major J, Rondon MA and Lehmann J 2006. Bio-Char Applications to a Tropical Oxisol Increase Crop

Yield and Modify Water Relations. In: Frontiers of Soil Science, 18 th World Congress of Soil Science, Philadelphia, PA, July 9-15, 2006. Poster 133-12. Abstract ID# 17230.

Ngoze S, Riha SJ, Kinyangi JM, Lehmann J, Verchot L, Mbugua DM and Pell AN 2006 Soil fertility degradation and management in the highlands of Kenya. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract, poster 147-11

Nguyen BT, Lehmann J and Kinyangi J 2006 Long-term black carbon (bio-char) dynamics in cultivated soil. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18638, poster 138-3.

O'Neill B, Grossman J, Tsai SM, Gomes JE, Garcia, Solomon CE, Liang B, Lehmann J and Thies J 2006 Isolating Unique Bacteria from Terra Preta Systems: Using Culturing and Molecular Techniques as Tools for Characterizing Microbial Life in Amazonian Dark Earths. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18480, poster 133-16.

Riha SJ, Barrett CB, Blume LE, Kinyangi JM, Lehmann CJ, Marenza PP, Mbugua DM, Nicholson CF, Ngoze SO, Parsons D, Verchot LV and Pell AN 2006 Long-Term Human and Biophysical Dynamics of Soil Degradation in the Kenyan Highlands. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18227, poster 156-2

Rondon MA, Molina D, Hurtado M, Ramirez J, Lehmann J, Major J and Amezquita E 2006 Enhancing the Productivity of Crops and Grasses while Reducing Greenhouse Gas Emissions through Bio-Char Amendments to Unfertile Tropical Soils. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 16849, poster 138-54.

Sato S, Liang B, Solomon D and Lehmann J 2006 Changes in Soil Phosphorus Fractions and Species in Amazonian Dark Earths (Terra Preta) across a Long Chronosequence. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18482, poster 133-8.

Solomon D, Lehmann J, Kinyangi J, Liang B, Lobe I, Amelung W and Schäfer T 2006 Soil organic C speciation and transformation following long-term anthropogenic perturbations in tropical ecosystems: evidence from ¹³C NMR and synchrotron-based C (1s) NEXAFS and FTIR-ATR spectroscopy. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 18543, poster 134-2.

Solomon D, Lehmann J, Thies J, Liang B, Kinyangi J, Luizão F and Skjemstad J 2006 Macromolecular Speciation of Organic Matter in Black C rich Anthrosols: Insight from ¹³C CP-MAS NMR and Synchrotron Based C (1s) NEXAFS and FTIR-ATR Spectroscopy. In World Congress of Soil Science, 9-14 July 2006, Philadelphia. Abstract 14673, poster 133-1.

Cheng C, Lehmann J and Thies J 2005 Biotic and abiotic influences on black carbon properties in soil. In: Analysis and Characterization of Black Carbon in the Environment, Annual Meeting of the European Geosciences Union, Vienna, 24-29 April 2005, No. EGU05-A-01023.

Chig, Léo Adriano, E. G. Couto, Stefan Jirka, Ted R Feldpausch, Susan Riha, Johannes Lehmann, João Paulo Novaes Filho, Luiz Carlos Mattos Rodrigues, and Evandro Carlos Selva. 2005. Relações quantitativas da medida de cor, textura e carbono orgânico para solos sob floresta tropical primária em Juruena, Mato Grosso. II Congresso de estudantes e bolsistas do experimento LBA- Resumos, II Congresso de estudantes e bolsistas do experimento LBA, Manaus, 2005, 48-48 Manaus: INPA.

Couto, E. G., João Paulo Novaes Filho, Evandro Carlos Selva, and Mark Johnson. 2005. Distribuição espacial de carbono em solo sob floresta primária na amazônia meridional. In LBA_ECO 9th Science Team Meeting, LBA_ECO 9th Science Team Meeting, São Paulo, 2005, Brasília: INPA.

Couto, E. G., João Paulo Novaes Filho, Johannes Lehmann, Mark Johnson, Evandro Carlos Selva, Luiz Carlos Mattos Rodrigues, Léo Adriano Chig, Ricardo Santos Silva Amorim, and Susan Riha. 2005. Estoque de carbono em floresta primária: estimativa com uso de diferentes atributos do solo e do terreno. In XXX Congresso Brasileiro de Ciência do Solo. Solos: Sustentabilidade e Qualidade Ambiental, XXX Congresso Brasileiro de Ciência do Solo, Recife, 2005, Recife: SBSC.

Couto, E. G., João Paulo Novaes Filho, Evandro Carlos Selva, Léo Adriano Chig, Luiz Carlos Mattos

Rodrigues, Mark Johnson, Susan Riha, and Johannes Lehmann. 2005. Estoque de carbono em microbacias sob vegetação de floresta na Amazônia Meridional. In II Congresso de Estudantes e bolsistas do LBA - Resumos, II Congresso de Estudantes e bolsistas do LBA, Manaus, 2005, 59-59 Manaus: INPA.

Day D, Lehmann J, Steiner C and Das KC 2005 Long-term Sequestration of Carbon in Soils using Charcoal from Renewable Energy Product. In: Third USDA Symposium on Greenhouse Gases & Carbon Sequestration in Agriculture and Forestry. Baltimore, March 21-24 2005.

Feldpausch TR, Lehmann J, Couto EG, Passos CAM and Riha S 2005 Carbon, forest structure, soil and hydrological relationships in a primary forest undergoing reduced impact logging in southern Amazonia. In LBA-ECO 9 th Investigators Meeting, Sao Paulo, Brazil, November 10-12, 2005. Abstract 14.4

Feldpausch, T.R. 2005. Forest science and sustainability: management, certification, and carbon cycling (Ciência e sustentabilidade de florestas: Manejo, certificação e ciclagem de carbono). United Nations Development Programme . Brasilia, Brazil.

Kern DC, Costa JA, Lehmann J, Costa ML, Kämpf N, Rodrigues TE, Frazao FJL and Sombroek W 2005 Aspectos pedogequímicos das Terras Pretas de Índio. Workshop Terra Preta Nova: A Terra Preta de Índio e sua Relevância na Agricultura Moderna. Annual Meeting of the Brazilian Soil Science Society, Recife, 19-20 July 2005. No. 3.

Johnson MS, Lehmann J, Couto E and Riha S 2005 Baseflow dominates biogeochemical fluxes from the critical zone to tropical headwater streams. In Sparks D, Brantley S, Chorover J, Firestone M, Richter D and White A (eds.) Frontiers in Exploration of the Critical Zone. Workshop, Newark, Delaware. pp. 52.

Johnson M, Lehmann J, Riha S and Couto E 2005 CO₂ dynamics in nested catchments: a longitudinal perspective from soil to 1st and 2nd order streams. Eos Trans. AGU, 86 (52), Fall Meet. Suppl., Abstract H22B-02

Lehmann J 2005 Synchrotron-based spectroscopy in soil research. Users Meeting, National Synchrotron, Saskatoon, Saskatchewan.

Lehmann J, Johnson M, Couto E and Riha S 2005 Soil properties determine fluvial losses of carbon in Amazonian headwaters. 9 th LBA-ECO Science Team Meeting, Conference Center of the American Chamber of Commerce, São Paulo, 14-15 November. Abstract 5.4

Lehmann J, Kinyangi J, Solomon D 2005 Carbon stabilization in biogenic nano-structures of soil microaggregates. The 2 nd International Conference on Mechanisms of Organic Matter Stabilization and Destabilization in Soils. Asilomar, CA. p. 74.

Lehmann J, Gaunt J and Rondon M 2005 Black Carbon Sequestration in Soil – A New Frontier. In: Third USDA Symposium on Greenhouse Gases & Carbon Sequestration in Agriculture and Forestry. Baltimore March 21-24 2005.

Lehmann J, Liang B and Solomon D 2005 Properties and function of black carbon in soil. In: Analysis and Characterization of Black Carbon in the Environment, Annual Meeting of the European Geosciences Union, Vienna, 24-29 April 2005, No. EGU05-A-00103.

Lehmann J, Solomon D, Machado S, Lobe I, Amelung W and Zhao F 2005 Speciation of organic sulfur in the environment. In Cavallaro N, Meeting of the Principle Investigators of the USDA, National Research Initiative. Newark, Delaware.

Liang B, Lehmann J and Solomon D 2005 Long-term C mineralization studies in high black carbon Anthrosols and adjacent low black carbon Oxisols. In: Analysis and Characterization of Black Carbon in the Environment, Annual Meeting of the European Geosciences Union, Vienna, 24-29 April 2005, No. EGU05-A-01333.

Liang B, Lehmann J, Major J, Luizao FJ and Solomon D 2005 Black C effects on soil fertility and

implications for nutrient cycling and management. In XV International Plant Nutrition Colloquium, Symposium 9: Nutrient Cycling and Management, Beijing, September 2005.

Pauletto D, Luizao FJ, Lehmann J and Feldpausch TR 2005 Producao anual de liteira grossa em floresta explorada seletivamente em MT. In LBA-ECO 9 th Investigators Meeting, Sao Paulo, Brazil, November 10-12, 2005. Abstract 11.4

Pauletto D, Luizao FJ, Lehmann J and Feldpausch TR 2005 Volume e conteudo de nutrientes na liteira grossa em areas sob manejo florestal. In LBA-ECO 9 th Investigators Meeting, Sao Paulo, Brazil, November 10-12, 2005. Abstract 14.6

Pell, A.N., J.M. Kinyangi, S.O. Ngoze, D.R. Brown, D.M. Mbugua, C.B. Barrett, L.E. Blume, J.G. Gamara, C.J. Lehmann, P.P. Marenja, H.A. Markewich, A.O. Odenyo, S.J. Riha, L.V. Verchot, and J. Wangila. 2005. Dynamics of poverty and soil degradation on smallholder farms in central and western Kenya. Workshop for Enhancing Collaborative Research on the Environment in Sub-Saharan Africa, National Science Foundation on Sub-Saharan Africa, Arlington, VA. January 24-6, 2005.

Rondon MA, Ramirez JA and Lehmann J 2005 Greenhouse Gas Emissions Decrease with Charcoal Additions to Tropical Soils. In: Third USDA Symposium on Greenhouse Gases & Carbon Sequestration in Agriculture and Forestry. Baltimore, March 21-24 2005.

Selva, Evandro Carlos, E. G. Couto, Mark Johnson, and Johannes Lehmann. 2005. Produção e exportação de carbono em microbacias na região sul da Amazônia. II Congresso de Estudantes bolsistas do LBA- Resumos, II Congresso de Estudantes e bolsistas do LBA, Manaus, 2005, 39-39 Manaus: INPA.

Smith, L.L., A. DiTommaso, J. Lehmann and S. Greipsson 2005 Influence of arbuscular mycorrhizal fungi on the invasive vine pale swallow-wort (*Vincetoxicum rossicum*). Proceedings of the 59th Annual Meeting of the Northeastern Weed Science Society of America, 59:132.

Sohi S, Gaunt J, Yates H Lehmann J 2005 Accounting for Black C in the Modeling of Soil Organic Matter Turnover. In: Third USDA Symposium on Greenhouse Gases & Carbon Sequestration in Agriculture and Forestry. Baltimore, March 21-24 2005.

Solomon D, Lehmann J, Kinyangi J, Liang B, Lobe I, Amelung W and Schaefer T 2005 Organic carbon in tropical ecosystems: insights into the chemical speciation and transformation using C-NEXAFS, SR-FTIR-ATR and ¹³C NMR spectroscopy. The 2 nd International Conference on Mechanisms of Organic Matter Stabilization and Destabilization in Soils. Asilomar, CA. p. 99.

Cheng CC, Lehmann J and Thies J 2004 Soil chemical properties influenced by water-washed charcoal: abiotic and biotic processes. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract Poster.

Chig LA, Couto ED, Riha S, Johnson MS, Filho JP, Lehmann J and Selva EC 2004 Uso da krigagem ordinária e da cokrigagem para estimar a matéria orgânica em solos de quatro microbacias sob vegetação de floresta no município de Juruena, MT. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 364.

Couto ED, Lehmann J, Filho JP, Johnson MS, Selva EC, Rodrigues LCM, Chig LA, Riha S and Fernandes ECM 2004 Aplicação da estatística multivariada para identificar diferenças nos atributos de solo em microbacias sob floresta tropical em Juruena-MT. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 217.

Couto, E. G., Johannes Lehmann, João Paulo Novaes Filho, Mark Johnson, Evandro Carlos Selva, Luiz Carlos Mattos Rodrigues, and Léo Adriano Chig. 2004. Fontes de variação de atributos químicos e físicos de solos em quatro microbacias sob vegetação florestal, em Juruena-MT. In 56a Reunião Brasileira da SBPC- Anais, 56a Reunião Brasileira da SBPC, Cuiabá, 2004, São Paulo: SBPC.

Feldpausch TR, Jirka S, Riha SJ, Passos CAM, Lehmann J, Jasper F, Fernandes ECM and

McDonald AJ 2004 Pre-harvest Tree and Vine Biomass in a Rainforest in NW Mato Grosso, Brazil. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 88.

Filho JP, Couto ED, Riha S, Johnson MS, Lehmann J, Selva EC, Rodrigues LCM and Chig LA 2004 Aplicação da geoestatística para identificar a ocorrência de Latossolos e Argissolos em quatro microbacias sob vegetação de floresta no município de Juruena, MT. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 306.

Gaunt J, Lehmann J, Duxbury J and Wightman J 2004 Do integrated energy and agricultural charcoal production techniques offer opportunities for carbon trading? In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract 3A.

Harawa R, Lehmann J, Akinnifesi FA, Kanyama-Phiri GY and Fernandes ECM 2004 Nitrogen fluxes in maize-based agroforestry cropping systems as affected by landscape positions. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 290.

Hyland C, Lehmann J, Ketterings Q, Lan Z and Sato S 2004 Forms and distribution of phosphorus leached from manure amended soils. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 375.

Johnson MS, Lehmann J, Couto ED, Riha S, Abdo M, Selva EC and Fernandes ECM 2004 Internal and external fluxes of dissolved organic carbon in forested headwater Amazonian catchments: Near-surface and aboveground controls on DOC exports. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 161.

Johnson MS, Lehmann J, Selva EC, Couto ED, Abdo M, Fernandes ECM, and Riha S 2004 Significant seasonal and event-driven changes of carbon and nutrient fluxes to first-order streams of an Amazon forest. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 269.

Kinyangi JM, Lehmann J and Solomon DM 2004 Using carbon K-edge XANES to assess organic matter stabilization in microaggregates during 100 years of cropping. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 395.

Kinyangi JM, Lehmann J, Thies J, Pell AN, Verchot L, Barret CB, Ngoze S, Mbugua DM and Riha SJ 2004 Biogeochemical characteristics of organic matter fractions that confer thresholds during soil degradation. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 396.

Lehmann J 2004 Characterization and Performance of Amazonian Dark Earths – Opportunities for Future Soil Management. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract Plenary.

Lehmann J 2004 Emergent issues for strategic research on soil management in Africa. In: Woomer PL and Lynam JK (Eds.) Enhanced Soil Productivity in East and Southern Africa: Program, Participants and Abstracts. Rockefeller Foundation Grantees Workshop, 20-23 September 2004, Safari Park Hotel, Nairobi, Kenya. p. 20.

Lehmann J and Liang B 2004 Terra Preta de Índio of the Amazon: opportunity to study black carbon dynamics in soil. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 368.

Lehmann J, Johnson MS, Couto ED, Riha S, Rodrigues LCM, Abdo M, Selva EC and Fernandes ECM 2004 Carbon, biogeochemistry, and hydrology: from terrestrial to aquatic systems. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasília, Brazil. Abstract No. 373.

Lehmann J, Liang B and Solomon D 2004 Black carbon properties in soil. Annual Meeting, American

Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 395.

Liang B and Lehmann J 2004 Novel synchrotron-based STXM technique for in situ study of black carbon chemical properties. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract Poster.

Major J, DiTommaso A, Lehmann J and Falcao N 2004 Maize and weed flora dynamics on Amazonian Dark Earth and adjacent soils in the central Brazilian Amazon. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract 2B

McDonald AJ, Jirka S, Feldpausch ER, Riha S, Passos CAM and Lehmann J 2004 Application of Remote Sensing Tools to Identify Forest Composition and Seasonal Dynamics in NW Mato Grosso. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 304.

Ngoze S, Riha SJ, Verchot L, Pell AN, Kinyangi JM, Mbugua DM and Lehmann J 2004 Nitrogen fluxes in soils amended with animal manure and tithonia biomass on a soil degradation chronosequence. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 239.

Noquelli MJS, Passos CAM, Fernandes ECM, Lehmann J, Riha S, Feldpausch T, R Jirka S Gandini E, Botelho PA and Fuhr S 2004 Regeneracao natural de floresta tropical ombrofila aberta com palmeiras, primaria, na Amazonia Meridional. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. xxx .

Passos CAM, Lehmann J, Riha S, Gandini E, Noquelli MJS, Botelho PA, Fuhr S, Fernandes ECM, Feldpausch TR and Jirka S 2004 Efeito de tratamentos silviculturais na estrutura de floresta tropical Ombrófila Aberta, na Amazônia Meridional. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 542.

Pell, A.N., D.M. Mbugua, L.V. Verchot, C.B. Barrett, L.E. Blume, J.G.P. Gamarra, J.M. Kinyangi, C.J. Lehmann, A.O. Odenyo, S.O. Ngoze, B.N. Okumu, M.J. Pfeffer, P.P. Marenja, S.J. Riha, and J. Wangila. 2004. The Interplay Between Smallholder Farmers and Fragile Tropical Agroecosystems in Kenya. Symposium on Frontiers in Biocomplexity: Reciprocal Interactions between Human and Natural Systems. AAAS Annual Meeting, February 14, 2004, Seattle, WA.

Rodrigues LCM, Selva EC, Couto ED, Lehmann J, Johnson MS and Filho JP 2004 Lixiviação do Nitrato em Quatro Microbacias Sob Cobertura Florestal no Município de Juruena/MT. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 555.

Rondon M, Ramirez JA and Lehmann J 2004 Greenhouse gas emissions (CH₄, N₂O) decrease with charcoal additions to highly weathered tropical soil. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract Poster.

Selva EC, Johnson MS, Couto ED, Lehmann J, and Rodrigues LCM 2004 Dinâmica do carbono em quatro microbacias sob floresta tropical, no município de Juruena, MT. In III LBA Scientific Conference, The Large-Scale Biosphere-Atmosphere Experiment in Amazonia. 27-29 July 2004, Brasilia, Brazil. Abstract No. 472.

Sato S, Hyland C, Solomon DM, Ketterings Q and Lehmann J 2004 Phosphorus speciation in poultry manure and manure-applied soils using XANES spectroscopy. Annual Meeting, American Society of Agronomy, Seattle, WA, November 1-4, 2004. CD ROM. Program p. 336.

Smith LL, DiTommaso A, Lehmann J and Griepsson S 2004 Biology of the invasive plant pale swallow-wort. Proceedings of the 58th Annual Meeting of the Northeastern Weed Science Society of America, 58: 96.

Soethe N, Lehmann J, and Engels C 2004 Predicting coarse root biomass from branching patterns of native tree species in a tropical mountain forest in South Ecuador. CIRAD, Montpellier

Steiner C, Teixeira WG, Lehmann J and Zech W 2004 Charcoal as a soil conditioner and nutrient retainer – studies in the humid tropics, Amazonia, Brazil. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract 2A.

Swami S, Teixeira WG, Lehmann J and Steiner C 2004 Socio-economic study of small-farmer charcoal production in the Brazilian Amazon. In Energy and Agricultural Carbon Utilization – Sustainable Alternatives to Sequestration, June 10-11 2004, Athens, Georgia. Abstract Poster.

Hyland C, Lan Z, Lehmann J and Ketterings Q 2003 Phosphorus leaching and retention in highly phosphorus-contaminated soils. Annual Meeting, American Society of Agronomy, Denver, CO, November 2-6, 2003. CD ROM.

Feldpausch TR, Jirka S, Riha S, Passos CA, Lehmann J, Jasper F, Noquelli MJMS, Botelho PA, Pauletto D, Gandini N and Fernandes ECM 2003 Pre-harvest tree and vine biomass in a forest in NW Mato Grosso, Brazil. Seventh LBA Science Team Business Meeting, Fortaleza, Ceara, Brazil, Nov 5-8. Abstract No. 13.7.

Feldpausch TR, Fernandes ECM, Rondon MA, Riha SJ, Wandelli E and Lehmann J 2003 Tropical forest recovery following human disturbance in central Amazônia: post-pasture forest structure, canopy cover, biomass and nutrient dynamics. International Young Scientists' Global Change Conference, START [www.start.org] and Third World Academy of Sciences/ICTP, November 16-19, 2003, Trieste, Italy. p. 83.

Johnson M, Lehmann J, Couto EG, Riha S, Selva E, Filho JPN, Rodrigues LCM, Tomazi M and Fernandes ECM 2003 Low-flow headwater stream nutrient concentrations controlled by weathering in four forested Amazonian watersheds. Seventh LBA Science Team Business Meeting, Fortaleza, Ceara, Brazil, Nov 5-8. Abstract No. 7.10.

Schwendener CM, Lehmann J, Camargo P and Fernandes ECM 2003 Determinação da transferencia do nitrogenio entre liteiras de alta e baixa qualidade pelo enriquecimento com 15 N em um Oxisol pobre em nutrientes ao norte de Manaus, Brasil. In: Claudino-Sales V, Tonini IM and Dantas EWC (eds.) VI Brazilian Ecology Congress, Fortaleza, Brazil. pp. 613-614.

Soethe N, Lehmann J and Engels C 2003 Effects of altitude on the ability of nutrient acquisition in South Ecuadorin mountain forests. In: Karlowski U, Kiel P, Pitsch T, Schöley G, Tagungsband der 16. Jahrestagung der Deutschen Gesellschaft für Tropenökologie (20.02.-22.02.2003 in Rostock, Germany). p. 183.

Soethe N, Lehmann J and Engels C 2003 Seasonal changes of fine root growth at different altitudes in South Ecuadorian montane forests. In: Fernandez L, Mosquera H, Mendoza Z, Carrasco S, Chacon J, Bussmann R, II. Congreso de la Conservacion de la Biodiversidad en los Andes y en la Amazonia (25.08.-30.08.2003 in Loja, Ecuador). p. 217.

Soethe N, Lehmann J and Engels C 2003 Coarse root architecture of some typical tree species at different altitudes in a tropical montane forest in southern Ecuador. In: Third Internrtional Symposium on Dynamics of Physiological Processes in Woody Roots (28.09.-03.10.2003 in Perth, Australia). p. 161.

Trujillo L, Luizão FJ and Lehmann J 2003 Dinamica do carbono e nutrientes disponiveis durante a compostagem de residuos organicos sob condicoes tropicais. In: Claudino-Sales V, Tonini IM and Dantas EWC (eds.) VI Brazilian Ecology Congress, Fortaleza, Brazil. pp. 660-662.

Welch S, Riha S, Fernandes ECM, Rondon MA, Wandelli EV and Lehmann CJ 2003 Light and water resource capture by post-pasture abandonment vegetation north of Manaus, Amazonas: effects of time, management, and nutrients. Seventh LBA Science Team Business Meeting, Fortaleza, Ceara, Brazil, Nov 5-8. Abstract No. 13.6.

Falcao N, Comerford N and Lehmann J 2002 Nutrient availability of anthropogenic dark earth soils. I. International Workshop on Anthropogenic Terra Preta Soils. July 13-23, Manaus and Santarem. p. 21.

Feldpausch TR, Fernandes EC and Lehmann J 2002 Enhancing subsoil root activity and uptake of mineral N by gypsum applications to secondary forest regenerating from degraded pastures in Central Amazonia, Brazil. Annual Meeting of the American Geophysical Union AGU, San Francisco, 6-10 December 2002. p.

Gaunt J, Duxbury J, Lehmann J, Yaron G, and Powlson DS 2002 How to get C trading to work? Annual Meeting, American Society of Agronomy, Indianapolis, IN, November 11-14, 2002. CD ROM.

Johnson M, Lehmann J 2002 Soil water repellency and land use change in the Amazon. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil. <http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>.

Johnson MS, Lehmann J and Fernandes EC 2002 Soil water repellency in Amazonian pastures. Annual Meeting of the American Geophysical Union AGU, San Francisco, 6-10 December 2002. p.

Kuczak CN, Fernandes ECM, Lehmann J and Rondon M 2002 Phosphorus fractions in earthworm casts and soils of agroforestry systems, pasture, and secondary forest in the Central Amazon Basin. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil. <http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>. p. 319

Lehmann J, and Kaiser K 2002 Organic nutrients in throughfall and soil solution of a mixed tree cropping systems and forests of central Amazônia. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil. <http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>. p. 330

Lehmann J, Cravo MS, McCann J, German L and Kern DC 2002 Soil fertility and production potential of dark earths. I. International Workshop on Anthropogenic Terra Preta Soils. July 13-23, Manaus and Santarem. p. 13.

Lehmann J, Solomon D, Janzen HH, Amelung W, Lobe I, Martinez CE, DuPreez C and Machado S 2002 Biogeochemical cycling of sulfur in soil. Annual Meeting of the American Geophysical Union AGU, San Francisco, 6-10 December 2002. p.

Schwendener CM, Fernandes ECM, Lehmann J, Rondon M and Wandelli E 2002 Green mulch applications affect Mineral nitrogen beneath cupuaci trees. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil. <http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>. p. 318

Schwendener CM, Fernandes ECM, Lehmann J, Rondon MA and Wandelli E 2002 Efeito de aplicações de adubos verdes sobre a dinâmica de nitrogênio em sistemas agroflorestais. In Maia JMF, Bustamente M, Souza M, Rodrigues R, Salvo L (eds.) Primeiro Congresso de Estudantes e Bolsistas do Experimento LBA, 18-20 March 2002. Campus da Universidade Federal do Pará, Belém, PA, Brasil. p. 38.

Seitz D, Lehmann J, Garcia M, Hanagarth W, Hoffman KH and Zech W 2002 A microcosm experiment to evaluate influence of nutrient release as mediated by diplopods from litter of agroforestry species using ¹⁵N marker. International Research on Food Security, Natural Resource Management and Rural Development, Deutscher Tropentag 9-11 October 2002, Kassel-Witzenhausen, <http://mars.wiz.uni-kassel.de/tropentag/proceedings/2002/html/node88.html>.

Seitz D, Lehmann J, Garcia M, Hanagarth W, Hoffman KH and Zech W 2002 Role of diplopods in decomposition and nitrogen release from litter of different qualities in central Amazonian agroforestry. International Research on Food Security, Natural Resource Management and Rural Development, Deutscher Tropentag 9-11 October 2002, Kassel-Witzenhausen, <http://mars.wiz.uni-kassel.de/tropentag/proceedings/2002/html/node89.html>.

Soethe N, Lehmann J, Reuter A and Engels C 2002 Coarse root architecture of *Graffenrieda emarginata* from two altitudes of a tropical montane forest in Ecuador. In: Tropische Biodiversität im Globalen Wandel. Annual Meeting of the German Society for Ecology. Goettingen, Germany. p. 460

Soethe N, Lehmann J and Engels C 2002 Effect of altitude on the ability of fine roots for nutrient acquisition in South Ecuadorian montane forests. In Proceedings of the 16th Annual Meeting of the German Society for Tropical Ecology, Rostock, Germany. p. 183.

Solomon D and Lehmann J 2002 Sulfur K-edge XANES Spectroscopy in soil organic matter studies. Annual Meeting, American Society of Agronomy, Indianapolis, IN, November 11-14, 2002. CD ROM.

Steiner C, Teixeira W, Lehmann J, Nehls T and Zech W 2002 Soil charcoal amendments maintain soil fertility and create a carbon sink. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil.

<http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>. p. 321

Steiner C, Teixeira W, Lehmann J, Nehls T and Zech W 2002 Soil charcoal amendments maintain soil fertility and create a carbon sink. International Research on Food Security, Natural Resource Management and Rural Development, Deutscher Tropentag 9-11 October 2002, Kassel-Witzenhausen, <http://mars.wiz.uni-kassel.de/tropentag/proceedings/2002/html/node98.html>

Trujillo L, Luizão FJ and Lehmann J 2002 Nutrient use efficiency in abandoned pasture soil under organic and chemical amendments. Large-Scale Biosphere-Atmosphere LBA Program, 2nd International Scientific Conference of the LBA, 7-10 July 2002, Manaus, Brazil.

<http://lba.cptec.inpe.br/abstracts/Manaus2002/submitted-abstracts-Manaus-July2002.pdf>. p. 335

Trujillo L, Luizão FJ and Lehmann J 2002 Aplicação de adubos orgânicos na recuperação da produtividade de solos sob pastagens abandonadas na Amazônia Central. In Maia JMF, Bustamente M, Souza M, Rodrigues R, Salvo L (eds.) Primeiro Congresso de Estudantes e Bolsistas do Experimento LBA, 18-20 March 2002. Campus da Universidade Federal do Pará, Belém, PA, Brasil. p. 23.

Kuczak C, Fernandes ECM, Lehmann J, Rondon MA 2001 Phosphorus fractions in earthworm casts and soils of agroforestry systems of the Brazilian Amazon. Annual Meeting, American Society of Agronomy, Charlotte, NC, October 21-25, 2001. CD ROM.

Lehmann J, Renck A, Teixeira W, Dinkelmeyer H and da Silva Jr. JP 2001 Nitrogen efficiency in tree-based cropping systems in the humid tropics. Annual Meeting, American Society of Agronomy, Charlotte, NC, October 21-25, 2001. CD ROM.

Lehmann J, da Silva Jr. JP, Nehls T, Steiner C, Cravo M and Glaser B 2001 O manejo de Terra Preta nova na Amazonia Central. XI Congresso da Sociedade de Arqueologia Brasileira, September 23-29 2001, Rio de Janeiro, Brazil. p. 64.

Lehmann J, da Silva Jr. JP, Nehls T, Steiner C, Cravo M and Glaser B 2001 Managing Terra Preta Nova in the central Amazon. In: Woods WI and Glaser B, Terra Preta Symposium at the Conference of the Latin American Geographers, June 13-14 2001, Benicassim, Spain. p. 15.

Schrumpf M, Lehmann J, Lyaruu HVM, and Zech W 2001 Regeneration tropischer Bergregenwälder am Beispiel des Mt. Kilimanjaro, Tanzania: Wasser- und Nährstoffflüsse. German Society of Tropical Ecology, Annual Meeting 2001, p.

Bähr E, Lehmann J, Wienecke F and Kaiser K 2000 Dissolved organic nutrients and carbon in tree cropping systems and forest sites in the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 171.

Campos CEP and Lehmann J 2000 Contrasting tree effects on soil P sorption and availability on a Xanthic Ferralsol. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 174.

Campos CEP and Lehmann J 2000 Tree effects on soil P availability on a Xanthic Ferralsol. In: International Symposium on Phosphorus in the Soil-Plant Continuum, Sept 17-23 2000, Beijing, China. p. 93.

Cravo MS, Lehmann J and Macêdo JLV 2000 Phosphorus properties and management for perennial crops in Amazonia. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 33.

Dinkelmeier H, Lehmann J, Kaiser K, Renck A, Treter U and Zech W 2000 Fate of applied N fertilizer in mixed tree cropping systems in the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 172.

Günther D, Lehmann J, Kaiser K, Treter U and Zech W 2000 Spatial variability of soil phosphorus pools in a mixed tree plantation. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 175.

Huwe B, Teixeira WG, Schroth G and Lehmann J 2000 Soil water dynamics in agroforestry systems. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 48.

Kaiser K, Lehmann J, Bähr E and Zech W 2000 Organic nutrients in soil and soil solution of monocultures, mixed cropping systems and forests of central Amazonia. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 25.

Kern J, Kreibich H, Darwich A, Furch K and Lehmann J 2000 Nutrient availability and transport along the aquatic/terrestrial transition zone of the Varzea floodplain forest. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 21.

Lehmann J and Cravo MS 2000 Phosphorus management for perennial crops in the central Amazon. In: International Symposium on Phosphorus in the Soil-Plant Continuum, Sept 17-23 2000, Beijing, China. p. 89.

Lehmann J, Teixeira W and Schroth G 2000 Assessing nutrient flux control in agroforestry. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 66.

Lehmann J, Trujillo L and Zech W 2000 Subsoil nitrogen dynamics in Amazonian forest successions. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 176.

Macêdo JLV, Figueiredo NN, Lehmann J and Cravo MS 2000 Evaluation of the nutrient contents of cupuaçu (*Theobroma grandiflorum*) as a function of different levels of fertilizers. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 170.

Marino W and Lehmann J 2000 Rhizosphere effects of perennial crops on microbial biomass, acid phosphatase and P pools of a highly weathered soil in the central Amazon. In: International Symposium on Phosphorus in the Soil-Plant Continuum, Sept 17-23 2000, Beijing, China. p. 23.

Marino W, Marschner P, Göllnitz I, Schroth G, Emmerich S, Gasparotto L, Lehmann J, Uguen K, and Lieberei R 2000 *Bactris gasipaes* H.B.K. - production factors in agro-ecosystems. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 223.

Marques JD, Teixeira W and Lehmann J 2000 Soil water availability as affected by the cover crop *Pueraria phaseoloides* in the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 182.

Menyailo O, Lehmann J, Cravo MS and Zech W 2000 Single-tree effects on denitrification and soil

microbial biomass in agroforestry systems and natural forests of the Amazon region. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 177.

Mota MS, Lehmann J and Schroth G 2000 Fertilizer effects on soil P, K, Mg and Ca contents in mixed tree cropping systems in central Amazonia. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 179.

Mota MS, Lehmann J and Schroth G 2000 Soil acidity and pH dynamics in a xanthic Ferralsol as affected by fertilization. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 178.

Renck A, Lehmann J, Teixeira W and Huwe B 2000 Rapid water changes in a highly aggregated Xanthic Ferralsols of the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 182.

Renck A, Lehmann J, Teixeira W and Zech W 2000 Soil nutrient leaching in mixed tree cropping systems in the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 181.

Seitz D, Lehmann J, Garcia M, Hanagarth W, Hoffmann KH and Zech W 2000 Litter quality effects on decomposition of central Amazonian agroforest tree species by diplopodes. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 186.

Seitz D and Lehmann J 2000 Fate of litter N as affected by diplopodes determined by ¹⁵N enrichment in the humid tropics. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 187.

Silva Jr JP, and Lehmann J 2000 Importance of *Pueraria phaseoloides* for the N cycle in tropical tree production. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 184.

Silva Jr JP, Silva RB, Fernandes TP and Lehmann J 2000 Microbial biomass as affected by litter quality and fertilization on a Xanthic Ferralsol. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 185.

Trujillo L, Lehmann J and Cravo MS 2000 Effects of cover crop and fertilization on nutrient dynamics in fruit tree cropping in the central Amazon. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 178.

Uguen K, Silva Jr JP and Lehmann J 2000 Organic matter management for perennial crops in Amazonia. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 24.

Zech W, Cravo MS, Laabs V, Pinto A, Lilienfein J, Glaser B, Teixeira W, Kaiser K. and Lehmann J 2000 New approaches towards sustainability on tropical Brazil. In Voß K (ed) German-Brazilian Workshop on Neotropical Ecosystems: Achievements and Prospects of Cooperative Research, 3-8 September 2000, University of Hamburg, Germany. p. 30.

Dinkelmeyer H, Lehmann J, Treter U and Zech W 1999 Stickstoffdynamik im System Boden-Pflanze perenner Mischkulturen in Zentralamazonien. German Society of Tropical Ecology, Annual Meeting 1999, Ulm. p. 67.

Figueiredo NN, Macedo JLV, Cravo MS and Lehmann J 1999 Evaluation of the nutrient contents of cupuassu (*Theobroma grandiflorum*) as a function of different levels of fertilizers. 2nd Conference on Fruit Tree Production in the Tropics and Subtropics, Bonn 1999. p. 37.

Führböter M, Glaser B, Zech W and Lehmann J 1999 Einfluss unterschiedlicher Landnutzung auf die Bodenfruchtbarkeit in Nord Tanzania. German Society of Tropical Ecology, Annual Meeting 1999, Ulm. p. 68.

Günther D, Lehmann J, Kaiser K, Treter U and Zech W 1999 Einzelbaumeffekte auf Phosphor-Pools eines xanthic Ferralsols in einem Agroforstsystem in Zentralamazonien. German Society of Tropical Ecology, Annual Meeting 1999, Ulm. p. 87.

Lehmann J, da Silva Jr. JP and Trujillo L 1999 Leguminous cover crops in tropical fruit tree production. 2nd Conference on Fruit Tree Production in the Tropics and Subtropics, Bonn 1999. International Society for Horticultural Science. p. 9.

Marques JDO, Teixeira WG and Lehmann J 1999 Physical and chemical characterisation of a soil profil up to 3m depth in the central Amazon (Caracterização de parâmetros físico-químicos de um latossolo amarelo, na região Amazônica). Soil Science Society of Brazil, Annual Meeting 1999, Brasilia. Session 6: T037-6.

Teixeira W, Schroth G, Marques JD, Lehmann J, Cravo MS, Huwe B and Zech W 1999 Degraded areas of the terra firme in the Amazon basin: soil characteristics and parameters for transport processes. ISSO Meeting 1999, Perdue, USA.

Von Willert W, Lehmann J and Wulf S 1999 Influence of runoff irrigation on plant and soil nutrients. Dahlia Greidinger International Symposium on Nutrient Management under Salinity and Water Stress. The Lowdermilk Faculty of Agricultural Engeneering, Haifa, Israel.

Lehmann J 1997 Nutrient cycling in agroforestry. 2nd Symposium for Tropical Useful Plants, Hamburg. p. 21.

Lehmann J, von Willert F, Wulf S and Zech W 1996 Influence of runoff irrigation on mineral nutrition of *Sorghum bicolor* (L.) in Northern Kenya. Conference of the International Soil Conservation Organisation. Bonn. p. 330.

Lehmann J, Droppelmann K and Zech W 1996 Sturzwasserbewässerung von *Sorghum bicolor* (L.) Moench. und jungen Plantagen von *Acacia saligna* als Alternative zur Regenbewässerung in Nord-Kenya. German Society of Tropical Ecology, Annual Meeting 1996, Dresden. p. 60.

Lehmann J, Küper U, Droppelmann K, Berliner P, Nyabundi O and Zech W 1995 Optimizing biomass production in a runoff agroforestry system in Northern Kenya. German Society of Tropical Ecology, Annual Meeting 1995. Hamburg. p. 29.