



Volume 104

January 2017

ISSN 0038-0717



S



B

# Soil Biology & Biochemistry



B



**Editor-in-Chief: K. RITZ**

**Chief Editors: C. CHENU;  
J. SCHIMEL; K.M. SCOW;  
P. MARSCHNER; R.G. JOERGENSEN;  
T.J. CLOUGH**

**Associate Chief Editors:  
C. TRASAR-CEPEDA;  
E. BLAGODATSKAYA; J.K. WHALEN;  
S.O. PETERSEN**

**Chief Editor of Citation Classics  
and Special Issues: R. BURNS**

**Reviews Editor: D. COLEMAN**



A Cooperating Journal of  
**IUSS**

## CONTENTS

- B. Kerré, B. Willaert and E. Smolders 1 Lower residue decomposition in historically charcoal-enriched soils is related to increased adsorption of organic matter
- Q. Liu, B. Liu, Y. Zhang, Z. Lin, T. Zhu, R. Sun, X. Wang, J. Ma, Q. Bei, G. Liu, X. Lin and Z. Xie 8 Can biochar alleviate soil compaction stress on wheat growth and mitigate soil N<sub>2</sub>O emissions?
- H. Li, S. Yang, Z. Xu, Q. Yan, X. Li, J.D. van Nostrand, Z. He, F. Yao, X. Han, J. Zhou, Y. Deng and Y. Jiang 18 Responses of soil microbial functional genes to global changes are indirectly influenced by aboveground plant biomass variation
- A.T. Giguere, A.E. Taylor, Y. Suwa, D.D. Myrold and P.J. Bottomley 30 Uncoupling of ammonia oxidation from nitrite oxidation: Impact upon nitrous oxide production in non-cropped Oregon soils
- L. Fu, C.R. Penton, Y. Ruan, Z. Shen, C. Xue, R. Li and Q. Shen 39 Inducing the rhizosphere microbiome by biofertilizer application to suppress banana Fusarium wilt disease
- J. Cui, T. Ge, Y. Kuzyakov, M. Nie, C. Fang, B. Tang and C. Zhou 49 Interactions between biochar and litter priming: A three-source <sup>14</sup>C and δ<sup>13</sup>C partitioning study
- L.-J. Ding, J.-Q. Su, H. Li, Y.-G. Zhu and Z.-H. Cao 59 Bacterial succession along a long-term chronosequence of paddy soil in the Yangtze River Delta, China
- M. Deppe, R. Well, A. Gieseemann, O. Spott and H. Flessa 68 Soil N<sub>2</sub>O fluxes and related processes in laboratory incubations simulating ammonium fertilizer depots
- G. Meyer, E.K. Bünemann, E. Frossard, M. Maurhofer, P. Mäder and A. Oberson 81 Gross phosphorus fluxes in a calcareous soil inoculated with *Pseudomonas protegens* CHA0 revealed by <sup>33</sup>P isotopic dilution
- X. Kong, Y. Duan, A. Schramm, J. Eriksen, M. Holmstrup, T. Larsen, R. Bol and S.O. Petersen 95 Mitigating N<sub>2</sub>O emissions from clover residues by 3,4-dimethylpyrazole phosphate (DMPP) without adverse effects on the earthworm *Lumbricus terrestris*
- Z. Hu, C. Xu, N.G. McDowell, D.J. Johnson, M. Wang, Y. Luo, X. Zhou and Z. Huang 108 Linking microbial community composition to C loss rates during wood decomposition
- C. Peltre, E.G. Gregorich, S. Bruun, L.S. Jensen and J. Magid 117 Repeated application of organic waste affects soil organic matter composition: Evidence from thermal analysis, FTIR-PAS, amino sugars and lignin biomarkers
- P.E. Noirot-Cosson, K. Dhaouadi, V. Etievant, E. Vaudour and S. Houot 128 Parameterisation of the NCSOIL model to simulate C and N short-term mineralisation of exogenous organic matter in different soils
- J. Jia, X. Feng, J.-S. He, H. He, L. Lin and Z. Liu 141 Comparing microbial carbon sequestration and priming in the subsoil versus topsoil of a Qinghai-Tibetan alpine grassland

Contents continued on penultimate page

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

<b>R.G. Burns</b>	A1	Soil Biology & Biochemistry Citation Classic XIV
<b>I. Kögel-Knabner</b>	A3	The macromolecular organic composition of plant and microbial residues as inputs to soil organic matter: Fourteen years on
<b>Z. Zhang, Y. Yuan, W. Zhao, H. He, D. Li, W. He, Q. Liu and H. Yin</b>	1	Seasonal variations in the soil amino acid pool and flux following the conversion of a natural forest to a pine plantation on the eastern Tibetan Plateau, China
<b>I.M. Lubbers, M.M. Pulleman and J.W. Van Groenigen</b>	12	Can earthworms simultaneously enhance decomposition and stabilization of plant residue carbon?
<b>Q. Zhang, G. Liang, D.D. Myrold and W. Zhou</b>	25	Variable responses of ammonia oxidizers across soil particle-size fractions affect nitrification in a long-term fertilizer experiment
<b>S. Eskandari, C.N. Guppy, O.G.G. Knox, R.J. Flavel, D. Backhouse and R.E. Haling</b>	37	Mycorrhizal contribution to phosphorus nutrition of cotton in low and highly sodic soils using dual isotope labelling ( <sup>32</sup> P and <sup>33</sup> P)
<b>A. van der Wal and W. de Boer</b>	45	Dinner in the dark: Illuminating drivers of soil organic matter decomposition
<b>L. Gao, M.A. Bowker, M. Xu, H. Sun, D. Tuo and Y. Zhao</b>	49	Biological soil crusts decrease erodibility by modifying inherent soil properties on the Loess Plateau, China
<b>M.T. Domínguez, E. Gutiérrez, B. González-Domínguez, M. Román, J.M. Ávila, C. Ramo, J.M. Gonzalez and L.V. García</b>	59	Impacts of protected colonial birds on soil microbial communities: When protection leads to degradation
<b>S.I. Pathan, L. Žifčáková, M.T. Ceccherini, O.L. Pantani, T. Větrovský and P. Baldrian</b>	71	Seasonal variation and distribution of total and active microbial community of β-glucosidase encoding genes in coniferous forest soil
<b>M. Hernández, R. Conrad, M. Klose, K. Ma and Y. Lu</b>	81	Structure and function of methanogenic microbial communities in soils from flooded rice and upland soybean fields from Sanjiang plain, NE China
<b>J.S. Barker, J.R. Christiansen and S. Grayston</b>	92	Indirect microbial effects on methane flux are stronger when the environmental influence is weaker in a temperate forest ecosystem
<b>S. McMahon and J.P. Schimel</b>	96	Shifting patterns of microbial N-metabolism across seasons in upland Alaskan tundra soils
<b>M.M. Wiedermann, E.S. Kane, T.J. Veverica and E.A. Lilleskov</b>	108	Are colorimetric assays appropriate for measuring phenol oxidase activity in peat soils?
<b>Z. Jing, R. Chen, S. Wei, Y. Feng, J. Zhang and X. Lin</b>	111	Response and feedback of C mineralization to P availability driven by soil microorganisms

*Contents continued on penultimate page*

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**ScienceDirect**



## CONTENTS

- S. Qin, C. Hu, T.J. Clough, J. Luo, O. Oenema and S. Zhou 1 Irrigation of DOC-rich liquid promotes potential denitrification rate and decreases  $N_2O/(N_2O+N_2)$  product ratio in a 0–2 m soil profile
- K. Wu, D. Chen, C. Tu, Y. Qiu, K.O. Burkey, S.C. Reberg-Horton, S. Peng and S. Hu 9  $CO_2$ -induced alterations in plant nitrate utilization and root exudation stimulate  $N_2O$  emissions
- J. Li, N. He, L. Xu, H. Chai, Y. Liu, D. Wang, L. Wang, X. Wei, J. Xue, X. Wen and X. Sun 18 Asymmetric responses of soil heterotrophic respiration to rising and decreasing temperatures
- Y. Luo, H. Zang, Z. Yu, Z. Chen, A. Gunina, Y. Kuzyakov, J. Xu, K. Zhang and P.C. Brookes 28 Priming effects in biochar enriched soils using a three-source-partitioning approach:  $^{14}C$  labelling and  $^{13}C$  natural abundance
- P.M. Chalk, J.-Z. He, M.B. Peoples and D. Chen 36  $^{15}N_2$  as a tracer of biological  $N_2$  fixation: A 75-year retrospective
- K.D. Schneider, R.P. Voroney, D.H. Lynch, A. Oberson, E. Frossard and E.K. Bünemann 51 Microbially-mediated P fluxes in calcareous soils as a function of water-extractable phosphate
- C. Gubry-Rangin, B. Novotnik, I. Mandić-Mulec, G.W. Nicol and J.I. Prosser 61 Temperature responses of soil ammonia-oxidising archaea depend on pH
- S. Bokhorst, P. Kardol, P.J. Bellingham, R.M. Kooyman, S.J. Richardson, S. Schmidt and D.A. Wardle 69 Responses of communities of soil organisms and plants to soil aging at two contrasting long-term chronosequences
- M.I. Bird, A.V. McBeath, P.L. Ascough, V.A. Levchenko, C.M. Wurster, N.C. Munksgaard, R.J. Smernik and A. Williams 80 Loss and gain of carbon during char degradation
- M.E. Giles, T.J. Daniell and E.M. Baggs 90 Compound driven differences in  $N_2$  and  $N_2O$  emission from soil; the role of substrate use efficiency and the microbial community
- Q. Tu, Z. He, L. Wu, K. Xue, G. Xie, P. Chain, P.B. Reich, S.E. Hobbie and J. Zhou 99 Metagenomic reconstruction of nitrogen cycling pathways in a  $CO_2$ -enriched grassland ecosystem
- H. Wang, J. Qi, D. Xiao, Z. Wang and K. Tian 109 A re-evaluation of dilution for eliminating PCR inhibition in soil DNA samples
- I.C. Meier, A.C. Finzi and R.P. Phillips 119 Root exudates increase N availability by stimulating microbial turnover of fast-cycling N pools
- S. Zecchin, A. Corsini, M. Martin, M. Romani, G.M. Beone, R. Zanchi, E. Zanzo, D. Tenni, M.C. Fontanella and L. Cavalca 129 Rhizospheric iron and arsenic bacteria affected by water regime: Implications for metalloid uptake by rice

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- |  |     |   |
|--|-----|---|
| X. Ding, B. Zhang, X. Lü, J. Wang and W.R. Horwath   | 1   | Parent material and conifer biome influence microbial residue accumulation in forest soils  |
| J. Ying, X. Li, N. Wang, Z. Lan, J. He and Y. Bai  | 10  | Contrasting effects of nitrogen forms and soil pH on ammonia oxidizing microorganisms and their responses to long-term nitrogen fertilization in a typical steppe ecosystem |
| Y. Li, Y. Li, S.X. Chang, X. Liang, H. Qin, J. Chen and Q. Xu  | 19  | Linking soil fungal community structure and function to soil organic carbon chemical composition in intensively managed subtropical bamboo forests                          |
| A.L. Romero-Olivares, S.D. Allison and K.K. Treseder   | 32  | Soil microbes and their response to experimental warming over time: A meta-analysis of field studies  |
| C. Bardon, F. Poly, F.e.Z. Haichar, X. Le Roux, L. Simon, G. Meiffren, G. Comte, S. Rouifed and F. Piola   | 41  | Biological denitrification inhibition (BDI) with procyanidins induces modification of root traits, growth and N status in <i>Fallopia x bohemica</i>                        |
| J.E. Mackay, L.M. Macdonald, R.J. Smernik and T.R. Cavagnaro   | 50  | Organic amendments as phosphorus fertilisers: Chemical analyses, biological processes and plant P uptake  |
| B. Adamczyk, M. Karonen, S. Adamczyk, M.T. Engström, T. Laakso, P. Saranpää, V. Kitunen, A. Smolander and J. Simon                                       | 60  | Tannins can slow-down but also speed-up soil enzymatic activity in boreal forest  |
| K. Mason-Jones and Y. Kuzyakov   | 68  | "Non-metabolizable" glucose analogue shines new light on priming mechanisms: Triggering of microbial metabolism   |
| J. Durán, J.L. Morse, A. Rodríguez, J.L. Campbell, L.M. Christenson, C.T. Driscoll, T.J. Fahey, M.C. Fisk, M.J. Mitchell, P.H. Templer and P.M. Groffman | 77  | Differential sensitivity to climate change of C and N cycling processes across soil horizons in a northern hardwood forest  |
| W. Xiao, S. Feng, Z. Liu, Y. Su, Y. Zhang and X. He  | 85  | Interactions of soil particulate organic matter chemistry and microbial community composition mediating carbon mineralization in karst soils                                |
| M. Sauvadet, M. Chauvat, N. Brunet and I. Bertrand   | 94  | Can changes in litter quality drive soil fauna structure and functions?   |
| S.D. Allison and M.L. Goulden  | 104 | Consequences of drought tolerance traits for microbial decomposition in the DEMENT model  |

Contents continued on penultimate page

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- M.M. Wiedermann, E.S. Kane, L.R. Potvin and E.A. Lilleskov 1 Interactive plant functional group and water table effects on decomposition and extracellular enzyme activity in *Sphagnum* peatlands
- A. Yamamoto, H. Akiyama, Y. Nakajima and Y.T. Hoshino 9 Estimate of bacterial and fungal N<sub>2</sub>O production processes after crop residue input and fertilizer application to an agricultural field by <sup>15</sup>N isotopomer analysis
- K.M. Rath, A. Maheshwari and J. Rousk 17 The impact of salinity on the microbial response to drying and rewetting in soil
- J. Eo, Y.-E. Na and M.-H. Kim 27 Influence of rhinoceros beetle (*Trypoxylus dichotomus septentrionalis*) larvae and temperature on the soil bacterial community composition under laboratory conditions
- S. Qin, Y. Pang, T. Clough, N. Wrage-Mönnig, C. Hu, Y. Zhang, S. Zhou and Y. Fang 36 N<sub>2</sub> production via aerobic pathways may play a significant role in nitrogen cycling in upland soils
- D.P. Di Lonardo, W. De Boer, P.J.A. Klein Gunnewiek, S.E. Hannula and A. Van der Wal 41 Priming of soil organic matter: Chemical structure of added compounds is more important than the energy content
- J. Friedl, C. Scheer, D.W. Rowlings, M.T. Mumford and P.R. Grace 55 The nitrification inhibitor DMPP (3,4-dimethylpyrazole phosphate) reduces N<sub>2</sub> emissions from intensively managed pastures in subtropical Australia
- C. Yin, F. Fan, A. Song, X. Fan, H. Ding, W. Ran, H. Qiu and Y. Liang 65 The response patterns of community traits of N<sub>2</sub>O emission-related functional guilds to temperature across different arable soils under inorganic fertilization
- A.L.C. Franco, M.A. Knox, W.S. Andriuzzi, C.M. de Tomasel, O.E. Sala and D.H. Wall 78 Nematode exclusion and recovery in experimental soil microcosms
- L.-S. Koutika, S.V. Tchichelle, L. Mareschal and D. Epron 84 Nitrogen dynamics in a nutrient-poor soil under mixed-species plantations of eucalypts and acacias
- L. Jiang, J. Zhu, Y. Qi, Q. Fu, H. Hu and Q. Huang 91 Increasing molecular structural complexity and decreasing nitrogen availability depress the mineralization of organic matter in subtropical forest soils

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- |   |     |  |
|---|-----|--|
| M.T. Prendergast-Miller, A.B. de Menezes, L.M. Macdonald, P. Toscas, A. Bissett, G. Baker, M. Farrell, A.E. Richardson, T. Wark and P.H. Thrall | 1   | Wildfire impact: Natural experiment reveals differential short-term changes in soil microbial communities  |
| Y. Zheng, H.-W. Hu, L.-D. Guo, I.C. Anderson and J.R. Powell  | 14  | Dryland forest management alters fungal community composition and decouples assembly of root- and soil-associated fungal communities                   |
| M.A. Harty, K.L. McGeough, R. Carolan, C. Müller, R.J. Laughlin, G.J. Lanigan, K.G. Richards and C.J. Watson                                    | 23  | Gross nitrogen transformations in grassland soil react differently to urea stabilisers under laboratory and field conditions                           |
| Y. Song, Y. Zou, G. Wang and X. Yu  | 35  | Altered soil carbon and nitrogen cycles due to the freeze-thaw effect: A meta-analysis   |
| T. Lian, J. Jin, G. Wang, C. Tang, Z. Yu, Y. Li, J. Liu, S. Zhang and X. Liu  | 50  | The fate of soybean residue-carbon links to changes of bacterial community composition in Mollisols differing in soil organic carbon                   |
| T. Bölscher, E. Paterson, T. Freitag, B. Thornton and A.M. Herrmann   | 59  | Temperature sensitivity of substrate-use efficiency can result from altered microbial physiology without change to community composition               |
| M. Maljanen, H. Yli-Moijala, C. Biasi, N.I.W. Leblans, H.J. De Boeck, B. Bjarnadóttir and B.D. Sigurdsson                                       | 70  | The emissions of nitrous oxide and methane from natural soil temperature gradients in a volcanic area in southwest Iceland                             |
| X. Peng, Q. Zhu, Z. Zhang and P.D. Hallett  | 81  | Combined turnover of carbon and soil aggregates using rare earth oxides and isotopically labelled carbon as tracers                                    |
| M. Singh, B. Sarkar, B. Biswas, N.S. Bolan and G.J. Churchman   | 95  | Relationship between soil clay mineralogy and carbon protection capacity as influenced by temperature and moisture                                     |
| K.O. Butenko, K.B. Gongalsky, D.I. Korobushkin, K. Ekschmitt and A.S. Zaitsev   | 107 | Forest fires alter the trophic structure of soil nematode communities  |
| C. Ai, G. Liang, X. Wang, J. Sun, P. He and W. Zhou   | 118 | A distinctive root-inhabiting denitrifying community with high $N_2O/(N_2O+N_2)$ product ratio   |
| Y. Chen, S. Ma, J. Sun, X. Wang, G. Cheng and X. Lu   | 124 | Chemical diversity and incubation time affect non-additive responses of soil carbon and nitrogen cycling to litter mixtures from an alpine steppe soil |
| Q. Tian, X. Wang, D. Wang, M. Wang, C. Liao, X. Yang and F. Liu   | 135 | Decoupled linkage between soil carbon and nitrogen mineralization among soil depths in a subtropical mixed forest                                      |

*Contents continued on penultimate page*

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**ScienceDirect**



## CONTENTS

- 1 Release of phosphorus from soil bacterial and fungal biomass following drying/rewetting  
*M.-V. Dinh, A. Guhr, M. Spohn and E. Matzner*
- 8 Soil heterotrophic CO<sub>2</sub> emissions from tropical high-elevation ecosystems (Páramos) and their sensitivity to temperature and moisture fluctuations  
*J. Curiel Yuste, A.-M. Hereş, G. Ojeda, A. Paz, C. Pizano, D. García-Angulo and E. Lasso*
- 12 Plant diversity represents the prevalent determinant of soil fungal community structure across temperate grasslands in northern China  
*Y.-L. Chen, T.-L. Xu, S.D. Veresoglou, H.-W. Hu, Z.-P. Hao, Y.-J. Hu, L. Liu, Y. Deng, M.C. Rillig and B.-D. Chen*
- 22 Responses of a mountain peatland to increasing temperature: A microcosm study of greenhouse gas emissions and microbial community dynamics  
*X. Wang, S. Siciliano, B. Helgason and A. Bedard-Haughn*
- 34 Regulation of soil organic matter decomposition in permafrost-affected Siberian tundra soils - Impact of oxygen availability, freezing and thawing, temperature, and labile organic matter  
*J. Walz, C. Knoblauch, L. Böhme and E.-M. Pfeiffer*
- 44 Changes in small organic N during early stages of soil development  
*C.R. Warren*
- 56 Three years of biochar amendment alters soil physiochemical properties and fungal community composition in a black soil of northeast China  
*Q. Yao, J. Liu, Z. Yu, Y. Li, J. Jin, X. Liu and G. Wang*
- 68 Changes in substrate availability drive carbon cycle response to chronic warming  
*G. Pold, A.S. Grandy, J.M. Melillo and K.M. DeAngelis*
- 79 Micro-arthropod community responses to ecosystem retrogression in boreal forest  
*S. Bokhorst, M.P. Berg and D.A. Wardle*
- 87 Bottle effects alter taxonomic composition of wetland soil bacterial communities during the denitrification enzyme activity assay  
*P.E. Hartzog, M. Sladek, J.J. Kelly and D.J. Larkin*
- 95 Succession of soil microarthropod communities during the aboveground and belowground litter decomposition processes  
*S. Fujii and H. Takeda*
- 103 Soil autotrophic and heterotrophic respiration in response to different N fertilization and environmental conditions from a cropland in Northeast China  
*Z. Chen, Y. Xu, J. Fan, H. Yu and W. Ding*
- 116 Soil fauna responses to natural disturbances, invasive species, and global climate change: Current state of the science and a call to action  
*D.R. Coyle, U.J. Nagendra, M.K. Taylor, J.H. Campbell, C.E. Cunard, A.H. Joslin, A. Mundepe, C.A. Phillips and M.A. Callahan Jr.*
- 134 Critical comparison of the impact of biochar and wood ash on soil organic matter cycling and grassland productivity  
*E.Y. Reed, D.R. Chadwick, P.W. Hill and D.L. Jones*

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



0038-0717(201707)110;1-#





## CONTENTS

- 1 From yogurt to yield: Potential applications of lactic acid bacteria in plant production  
*J.R. Lamont, O. Wilkins, M. Bywater-Ekegård and D.L. Smith*
- 10 Keystone microbial taxa regulate the invasion of a fungal pathogen in agro-ecosystems  
*P. Trivedi, M. Delgado-Baquerizo, C. Trivedi, K. Hamonts, I.C. Anderson and B.K. Singh*
- 15 Impact of decade-long warming, nutrient addition and shading on emission and carbon isotopic composition of CO<sub>2</sub> from two subarctic dwarf shrub heaths  
*N.R. Ravn, P. Ambus and A. Michelsen*
- 25 Use of municipal solid wastes for chemical and microbiological recovery of soils contaminated with metal(loid)s  
*G. Garau, M. Silvetti, S. Vasileiadis, E. Donner, S. Diquattro, S. Deiana, E. Lombi and P. Castaldi*
- 36 Ecosystem services of the soil food web after long-term application of agricultural management practices  
*X. Zhang, H. Ferris, J. Mitchell and W. Liang*
- 44 Quantifying *in situ* and modeling net nitrogen mineralization from soil organic matter in arable cropping systems  
*H. Clivot, B. Mary, M. Valé, J.-P. Cohan, L. Champolivier, F. Piraux, F. Laurent and E. Justes*
- 60 Examination of residual chloroform interference in the measurement of microbial biomass C by fumigation-extraction  
*N. Rotbart, M. Borisover, N. Bukhanovsky, A. Nasonova, A. Bar-Tal and A. Oren*
- 66 In-depth analysis of core methanogenic communities from high elevation permafrost-affected wetlands  
*S. Yang, S. Liebner, M. Winkel, M. Alawi, F. Horn, C. Dörfer, J. Ollivier, J.-s. He, H. Jin, P. Kühn, M. Schloter, T. Scholten and D. Wagner*
- 78 Rhizosphere priming effect: A meta-analysis  
*C. Huo, Y. Luo and W. Cheng*
- 85 Effects of titanium dioxide nanoparticles on soil microbial communities and wheat biomass  
*J. Moll, F. Klingenfuss, F. Widmer, A. Gogos, T.D. Bucheli, M. Hartmann and M.G.A. van der Heijden*
- 94 Soil protistology rebooted: 30 fundamental questions to start with  
*S. Geisen, E.A.D. Mitchell, D.M. Wilkinson, S. Adl, M. Bonkowski, M.W. Brown, A.M. Fiore-Donno, T.J. Heger, V.E.J. Jassey, V. Krashevskaya, D.J.G. Lahr, K. Marcisz, M. Mulot, R. Payne, D. Singer, O.R. Anderson, D.J. Charman, F. Ekelund, B.S. Griffiths, R. Rønn, A. Smirnov, D. Bass, L. Belbahri, C. Berney, Q. Blandenier, A. Chatzinotas, M. Clarholm, M. Dunthorn, A. Feest, L.D. Fernández, W. Foissner, B. Fournier, E. Gentekaki, M. Hájek, J. Helder, A. Jousset, R. Koller, S. Kumar, A. La Terza, M. Lamentowicz, Y. Mazei, S.S. Santos, C.V.W. Seppey, F.W. Spiegel, J. Walochnik, A. Winding and E. Lara*
- 104 Scale-dependent key drivers controlling methane oxidation potential in Chinese grassland soils  
*Y. Kou, J. Li, Y. Wang, C. Li, B. Tu, M. Yao and X. Li*

Contents continued on inside back cover

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- 1 Altitudinal, seasonal and interannual shifts in microbial communities and chemical composition of soil organic matter in Alpine forest soils  
*J.A. Siles, T. Cajthaml, A. Filipová, S. Minerbi and R. Margesin*
- 14 Population structure of *Rhizobium etli*-like strains nodulated with *Phaseolus vulgaris* in two ecoregions of China  
*Y. Cao, E. Wang, W. Tong, Y. Qiao, L. Zhao, W. Chen and G. Wei*
- 24 Chronic nitrogen deposition influences the chemical dynamics of leaf litter and fine roots during decomposition  
*M. Xia, A.F. Talhelm and K.S. Pregitzer*
- 35 Soil macrofauna abundance under dominant tree species increases along a soil degradation gradient  
*S. Kamau, E. Barrios, N.K. Karanja, F.O. Ayuke and J. Lehmann*
- 47 Nitrogen fertilization decreases the decomposition of soil organic matter and plant residues in planted soils  
*X.G. Li, B. Jia, J. Lv, Q. Ma, Y. Kuzyakov and F.-m. Li*
- 56 Effects of salinity and wet-dry treatments on C and N dynamics in coastal-forested wetland soils: Implications of sea level rise  
*X. Liu, A. Ruecker, B. Song, J. Xing, W.H. Conner and A.T. Chow*
- 68 Distribution patterns of soil microbial eukaryotes suggests widespread algivory by phagotrophic protists as an alternative pathway for nutrient cycling  
*C.V.W. Seppey, D. Singer, K. Dumack, B. Fournier, L. Belbahri, E.A.D. Mitchell and E. Lara*
- 77 Time-dependent shifts in populations and activity of bacterial and archaeal ammonia oxidizers in response to liming in acidic soils  
*M.-M. Zhang, R.J.E. Alves, D.-D. Zhang, L.-L. Han, J.-Z. He and L.-M. Zhang*
- 90 Soil carbon loss regulated by drought intensity and available substrate: A meta-analysis  
*A. Canarini, L.P. Kiær and F.A. Dijkstra*
- 100 Spatio-temporal patterns of enzyme activities after manure application reflect mechanisms of niche differentiation between plants and microorganisms  
*S. Liu, B.S. Razavi, X. Su, M. Maharjan, M. Zarebanadkouki, E. Blagodatskaya and Y. Kuzyakov*
- 110 Decoupling direct and indirect effects of temperature on decomposition  
*M.A. Rubenstein, T.W. Crowther, D.S. Maynard, J.S. Schilling and M.A. Bradford*
- 117 Host plant colonisation by arbuscular mycorrhizal fungi stimulates immune function whereas high root silicon concentrations diminish growth in a soil-dwelling herbivore  
*A. Frew, J.R. Powell, I. Hiltbold, P.G. Allsopp, N. Sallam and S.N. Johnson*
- 127 Is the rate of mineralization of soil organic carbon under microbiological control?  
*P.C. Brookes, Y. Chen, L. Chen, G. Qiu, Y. Luo and J. Xu*
- 140 Soil depth and crop determinants of bacterial communities under ten biofuel cropping systems  
*B. Zhang, C.R. Penton, C. Xue, J.F. Quensen, S.S. Roley, J. Guo, A. Garoutte, T. Zheng and J.M. Tiedje*

Contents continued on inside back cover

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**ScienceDirect**



## CONTENTS

- 1 Evident variations of fungal and actinobacterial cellulolytic communities associated with different humified particle-size fractions in a long-term fertilizer experiment  
*Q. Zhang, G. Liang, T. Guo, P. He, X. Wang and W. Zhou*
- 14 Is biochar-manure co-compost a better solution for soil health improvement and N<sub>2</sub>O emissions mitigation?  
*Y. Yuan, H. Chen, W. Yuan, D. Williams, J.T. Walker and W. Shi*
- 26 Long-term nitrogen & phosphorus additions reduce soil microbial respiration but increase its temperature sensitivity in a Tibetan alpine meadow  
*H. Guo, C. Ye, H. Zhang, S. Pan, Y. Ji, Z. Li, M. Liu, X. Zhou, G. Du, F. Hu and S. Hu*
- 35 Combined effects of rhizodeposit C and crop residues on SOM priming, residue mineralization and N supply in soil  
*L.D. Mwafurirwa, E.M. Baggs, J. Russell, N. Morley, A. Sim and E. Paterson*
- 45 Ants can exert a diverse effect on soil carbon and nitrogen pools in a Xishuangbanna tropical forest  
*S. Wang, H. Wang, J. Li and Z. Zhang*
- 53 Turnover of carbon and phosphorus in the microbial biomass depending on phosphorus availability  
*M. Spohn and M. Widdig*
- 60 N fertilization in a Mediterranean ecosystem alters N and P turnover in soil, roots and the ectomycorrhizal community  
*F. Ulm, C. Gouveia, T. Dias and C. Cruz*
- 71 SoilChip-XPS integrated technique to study formation of soil biogeochemical interfaces  
*X. Huang, Y. Li, B. Liu, G. Guggenberger, O. Shibistova, Z. Zhu, T. Ge, W. Tan and J. Wu*
- 80 Shifting mechanisms of elevational diversity and biomass patterns in soil invertebrates at treeline  
*G. Xu, Y. Lin, S. Zhang, Y. Zhang, G. Li and K. Ma*
- 89 Wheat straw-derived biochar amendment stimulated N<sub>2</sub>O emissions from rice paddy soils by regulating the *amoA* genes of ammonia-oxidizing bacteria  
*Y. Lin, W. Ding, D. Liu, T. He, G. Yoo, J. Yuan, Z. Chen and J. Fan*
- 99 Base cations, K<sup>+</sup> and Ca<sup>2+</sup>, have contrasting effects on soil carbon, nitrogen and denitrification dynamics as pH rises  
*C. Anderson, M. Peterson and D. Curtin*
- 108 Stability and dynamics of enzyme activity patterns in the rice rhizosphere: Effects of plant growth and temperature  
*T. Ge, X. Wei, B.S. Razavi, Z. Zhu, Y. Hu, Y. Kuzyakov, D.L. Jones and J. Wu*
- 116 Sporulation and physiological profiles of bacterial communities of three Mediterranean soils affected by drying-rewetting or freezing-thawing cycles  
*L. Daou, M. Luglia, C. Périssol, V. Calvert and S. Criquet*
- 122 Probiotic *Pseudomonas* communities enhance plant growth and nutrient assimilation via diversity-mediated ecosystem functioning  
*J. Hu, Z. Wei, S. Weidner, V.-P. Friman, Y.-C. Xu, Q.-R. Shen and A. Jousset*

Contents continued on inside back cover

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- 1 Positive effects of plant association on rhizosphere microbial communities depend on plant species involved and soil nitrogen level  
*B. Pivato, D. Bru, H. Busset, F. Deau, A. Matejcek, L. Philippot and D. Moreau*
- 5 Estimating decay dynamics for enzyme activities in soils from different ecosystems  
*J. Schimel, C.A. Becerra and J. Blankinship*
- 12 pH drives ammonia oxidizing bacteria rather than archaea thereby stimulate nitrification under *Ageratina adenophora* colonization  
*H. Xiao, D.A. Schaefer and X. Yang*
- 20 Response of ammonia-oxidizing archaea and bacteria in calcareous soil to mineral and organic fertilizer application and their relative contribution to nitrification  
*R. Tao, S.A. Wakelin, Y. Liang and G. Chu*
- 31 Long term farming systems affect soils potential for N<sub>2</sub>O production and reduction processes under denitrifying conditions  
*H.-M. Krause, C. Thonar, W. Eschenbach, R. Well, P. Mäder, S. Behrens, A. Kappler and A. Gatterger*
- 42 Mixed grazing and clipping is beneficial to ecosystem recovery but may increase potential N<sub>2</sub>O emissions in a semi-arid grassland  
*L. Zhong, X. Zhou, Y. Wang, F.Y. Li, S. Zhou, Y. Bai and Y. Rui*
- 52 Changes in microbial community composition following phytostabilization of an extremely acidic Cu mine tailings  
*T.-t. Yang, J. Liu, W.-c. Chen, X. Chen, H.-y. Shu, P. Jia, B. Liao, W.-s. Shu and J.-t. Li*
- 59 Rolling in the deep: Priming effects in earthworm biopores in topsoil and subsoil  
*D.T.T. Hoang, S.L. Bauke, Y. Kuzyakov and J. Pausch*
- 72 Infra-red spectroscopy reveals chemical interactions driving water availability for enzyme activities in litters of typical Mediterranean tree species  
*A.M. Farnet-Da Silva, E. Ferré, N. Dupuy, A. de la Boussinière and C. Rébua*
- 82 Extracellular enzyme kinetics and thermodynamics along a climate gradient in southern California  
*N.R. Baker and S.D. Allison*
- 93 Improving *in situ* recovery of soil nitrogen using the microdialysis technique  
*S. Buckley, R. Brackin, T. Näsholm, S. Schmidt and S. Jämtgård*
- 104 Responses of rice paddy micro-food webs to elevated CO<sub>2</sub> are modulated by nitrogen fertilization and crop cultivars  
*Z. Hu, C. Zhu, X. Chen, M. Bonkowski, B. Griffiths, F. Chen, J. Zhu, S. Hu, F. Hu and M. Liu*
- 114 Linkage of microbial residue dynamics with soil organic carbon accumulation during subtropical forest succession  
*S. Shao, Y. Zhao, W. Zhang, G. Hu, H. Xie, J. Yan, S. Han, H. He and X. Zhang*
- 121 Nickel drives bacterial community diversity in the rhizosphere of the hyperaccumulator *Alyssum murale*  
*S. Lopez, S. Piutti, J. Vallance, J.-L. Morel, G. Echevarria and E. Benizri*
- 131 Peatlands in a eutrophic world – Assessing the state of a poor fen-bog transition in southern Ontario, Canada, after long term nutrient input and altered hydrological conditions  
*S. Berger, G. Gebauer, C. Blodau and K.-H. Knorr*

Contents continued on inside back cover

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data, Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



## CONTENTS

- Differential responses of soil microbial biomass and carbon-degrading enzyme activities to altered precipitation  
*C. Ren, F. Zhao, Z. Shi, J. Chen, X. Han, G. Yang, Y. Feng and G. Ren*
- A key role for arbuscular mycorrhiza in plant acquisition of P from sewage sludge recycled to soil  
*J.E. Mackay, T.R. Cavagnaro, D.S.M. Stöver, L.M. Macdonald, M. Grønlund and I. Jakobsen*
- Long-term field measurements of annual methane and nitrous oxide emissions from a Chinese subtropical wheat-rice rotation system  
*M. Zhou, B. Zhu, X. Wang and Y. Wang*
- Biomarker function and nutritional stoichiometry of neutral lipid fatty acids and amino acids in oribatid mites  
*A. Brückner, A. Hilpert and M. Heethoff*
- Does species richness of subtropical tree leaf litter affect decomposition, nutrient release, transfer and subsequent uptake by plants?  
*K.N. Leppert, P.A. Niklaus and M. Scherer-Lorenzen*
- Soil carbon and nitrogen dynamics throughout the summer drought in a California annual grassland  
*S.M. Schaeffer, P.M. Homyak, C.M. Boot, D. Roux-Michollet and J.P. Schimel*
- In situ* measurements reveal extremely low pH in soil  
*K.E. Nielsen, A. Irizar, L.P. Nielsen, S.M. Kristiansen, C. Damgaard, M. Holmstrup, A.R. Petersen and M. Strandberg*
- Trophic dynamics in a simple experimental ecosystem: Interactions among centipedes, Collembola and introduced earthworms  
*M. Gao, M.K. Taylor and M.A. Callaham Jr.* 66
- 1 Short-term microbial respiration in an arid zone mangrove soil is limited by availability of gallic acid, phosphorus and ammonium  
*T.K.R. Davies, C.E. Lovelock, N.E. Pettit and P.F. Grierson* 73
- 11 Spatial and phylogeographical analyses of *nosZ* genes underscore niche differentiation amongst terrestrial N<sub>2</sub>O reducing communities  
*J. Juhanson, S. Hallin, M. Söderström, M. Stenberg and C.M. Jones* 82
- 21 Trends in soil microbial communities during secondary succession  
*Z. Zhou, C. Wang, L. Jiang and Y. Luo* 92
- 35 The role of macro-aggregation in regulating enzymatic depolymerization of soil organic nitrogen  
*J. Fukumasu and L.J. Shaw* 100
- Tree roots select specific bacterial communities in the subsurface critical zone  
*O. Nicolitch, Y. Colin, M.-P. Turpault, L. Fauchery and S. Uroz* 109
- 44 Impacts of tropospheric ozone exposure on peatland microbial consumers  
*R.J. Payne, S. Toet, M. Ashmore, V.E.J. Jassey and D. Gilbert* 124
- 54 DNA extraction efficiency from soil as affected by pyrolysis temperature and extractable organic carbon of high-ash biochar  
*Z. Dai, T.M. Webster, A. Enders, K.L. Hanley, J. Xu, J.E. Thies and J. Lehmann* 129

Contents continued on inside back cover

*Soil Biol. Biochem.* is Indexed/Abstracted in: AGRICOLA, Aqua. Abstr., Biobase, Biol. Agric. Indx, Biosis Data., CAB Inter., CABS, Cam. Sci. Abstr., Curr. Cont./Agri. Bio. Env. Sci., Curr. Cont. Sci. Cit. Indx, Curr. Cont. SCISEARCH Data, Environ. Per. Bibl., Geo. Abstr., Geobase, PASCAL-CNRS Data Res. Alert. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect



0038-0717(201712)115:C;1-0

