

Metadata form of *Silva Fennica*

This form is designed for writing the elements of metadata, which are used in the description of research materials such as data and codes. The form is based on the work done in the Work Group “Description of research materials” under the Finnish Open Science Coordination.

Item	Description	Responsible
<i>Name of the data / code</i>	Bacterial fertilizer and filtered sludge enhance soil quality and eucalyptus growth: A long-term field study.	Author
<i>Author & ORCID</i>	Han Ren (0000-0002-0156-0726), Xuezhen Chen, Xiaohong Qin, Suyang Zhang, Chengqun Lv, Jiangmin Zhou, Hualin Chen	Author
<i>Authors' affiliation(s)</i>	Wenzhou University, Guangxi University	Author
<i>Owner of the material</i>	Han Ren	Author
<i>Publisher</i>	Wenzhou University	Author
<i>Funder</i>	National Natural Science Foundation of China (32201326)	Author
<i>Description</i>	In this study, we evaluated the impact of sludge and/or PGPR application on the nutrient contents and enzyme activities of the soil as well as on plant growth. We planted bare-root eucalyptus seedlings in (1) soil amended with filtered sludge from sugar factory (FS), (2) soil amended with filtered sludge + PGPR (BF), and (3) non-amended soil (control). Soil quality and eucalyptus growth were determined after 3, 6, 9, and 12 months.	Author
<i>Methods</i>	<p>Instruments, Sampling and Analysis Methods, and Programmes:</p> <ul style="list-style-type: none"> • Instruments: C/N analyzer (Vario, Max, CN), flow injection auto-analyzer (Technicon, AA3, Germany), band tape, Vernier caliper. • Sampling Methods: Composite rhizosphere soil samples were collected from each treatment block at 3, 6, 9, and 12 months after planting. • Analysis Methods: Soil nutrients were analyzed using the C/N analyzer and flow injection auto-analyzer. Soil enzyme activities were determined by colorimetric methods. Plant growth parameters were measured directly. • Programmes: R 3.4.2 was used for statistical analysis, including ANOVA, PCA, and pooled regression modeling. The ggbiplot package in R was used for PCA visualization. 	Author
<i>Variables</i>	<ol style="list-style-type: none"> 1. Soil Total Nitrogen: Full Name: Total Nitrogen in Soil Abbreviation: TN SI Unit: mg g⁻¹ (milligrams per gram) 2. Soil Available Nitrogen: Full Name: Available Nitrogen in Soil Abbreviation: AN SI Unit: µg g⁻¹ (micrograms per gram) 3. Soil Available Phosphorus: Full Name: Available Phosphorus in Soil Abbreviation: AP SI Unit: mg g⁻¹ (milligrams per gram) 4. Soil Available Potassium: Full Name: Available Potassium in Soil Abbreviation: AK 	Author

	<p>SI Unit: $\mu\text{g g}^{-1}$ (micrograms per gram)</p> <p>5. Soil Catalase Activity: Full Name: Catalase Activity in Soil Abbreviation: CAT SI Unit: $\text{mg. g}^{-1}. (24\text{h})^{-1}$ (milligrams per gram per 24 hours)</p> <p>6. Soil Urease Activity: Full Name: Urease Activity in Soil Abbreviation: Urease SI Unit: $\text{mg. g}^{-1}. (24\text{h})^{-1}$ (milligrams per gram per 24 hours)</p> <p>7. Soil Sucrase Activity: Full Name: Sucrase Activity in Soil Abbreviation: Sucrase SI Unit: $\text{mg. g}^{-1}. (24\text{h})^{-1}$ (milligrams per gram per 24 hours)</p>	
<i>Author keywords</i>	Plant growth-promoting rhizobacteria (PGPR); Soil quality; Soil enzymes (e.g., catalase, urease, sucrase); Soil nutrients (e.g., total nitrogen, available nitrogen, available phosphorus, available potassium); Eucalyptus growth; Sustainability; Forestry; Soil fertility	Author
<i>Vocabulary keywords (community standard)</i>	<ol style="list-style-type: none"> 1. Plant Growth-Promoting Rhizobacteria (PGPR) Controlled Vocabulary: AgroVoc Link: https://agrovoc.org/search?searchPhrase=Plant+Growth-Promoting+Rhizobacteria+%28PGPR%29 2. Biofertilizer Controlled Vocabulary: AgroVoc Link: https://agrovoc.org/search?searchPhrase=biofertilizer 3. Soil Quality Controlled Vocabulary: AgroVoc Link: https://agrovoc.org/search?searchPhrase=soil+quality 4. Soil Enzymes Controlled Vocabulary: Enzyme Nomenclature Database (ENZYME) Note: ENZYME does not directly provide keywords but rather enzyme classifications and EC numbers. Relevant EC numbers for the enzymes mentioned in the study (catalase, urease, sucrase) can be looked up. Link: https://enzyme.expasy.org/ 5. Soil Nutrients Controlled Vocabulary: AgroVoc Specific Nutrients: <ul style="list-style-type: none"> ▪ Nitrogen (N) - https://agrovoc.org/search?searchPhrase=nitrogen Phosphorus (P) - https://agrovoc.org/search?searchPhrase=phosphorus Potassium (K) - https://agrovoc.org/search?searchPhrase=potassium 6. Eucalyptus 	Author

	<p>Taxonomic Database: The Plant List</p> <ul style="list-style-type: none"> ○ Link: https://www.theplantlist.org/tpl1.1/search?q=Euca yptus <p>7. Agriculture and Forestry</p> <ul style="list-style-type: none"> ○ Both are broad disciplines and are well-represented in AgroVoc. ○ Agriculture: https://agrovoc.org/search?searchPhrase=agriculture ○ Forestry: https://agrovoc.org/search?searchPhrase=forestry. 	
<i>Discipline</i>	N/A	Archive/Repository/Publisher
<i>Type of material</i>	Research data	Author
<i>Language</i>	ENG	Author
<i>Time range covered</i>	2016-01 to 2017-01	To Author
<i>Geographic region</i>	<p>Liangfengjiang National Park, Nanning, Guangxi, China</p> <p>Coordinates:</p> <p>Latitude: approximately 22.2167°N to 23.5333°N</p> <p>Longitude: approximately 107.75°E to 108.85°E</p>	Author
<i>Version</i>	Version_20240702	Author
<i>File format(s)</i>	Word document file that contains text, tables, and figures	Author
<i>Availability of the materials (open, embargo, registration, limited, registration required)</i>	Data Availability Statement: The data presented in this study are available at the Zenodo repository: https://doi.org/10.5281/zenodo.13352574	Author
<i>Justification for access restrictions</i>	This justification is acceptable because sharing sensitive or personal information without proper consent could violate individual privacy rights. By restricting access to those who request it and who agree to handle the data in a privacy-respecting manner, the researchers ensure that the privacy of individuals or entities involved in the study is protected. This approach balances the need for scientific transparency and reproducibility with the obligation to protect personal privacy.	Author
<i>Licence</i>	We would consider applying an appropriate Creative Commons license to enable reuse of the data and results while maintaining privacy concerns.	Author
<i>Connections with other research materials</i>	Relationship of the material with other research materials: 1) The material is derived from another material e.g., research data is derived from raw data (IsBasedOn)	Author
<i>Access to the connected research materials</i>	<p>The materials described in the manuscript are not explicitly stated to be openly accessible.</p> <p>To request access to the related research materials, including raw data, the corresponding author should be contacted.</p>	Author
<i>Codes only: hardware/software requirements for running the code</i>	<p>Operating System:</p> <p>The analyses described in the manuscript could be run on a variety of operating systems, including Windows, macOS, or Linux. Most statistical software and programming environments that are capable of handling the described analyses (e.g., R, SPSS, SAS) are cross-platform and can run on multiple operating systems.</p> <p>Programming Environment:</p> <p>The analyses in the manuscript were performed using R (version 3.4.2), indicating that an installation of R and any necessary</p>	Author

	<p>packages (e.g., ggbiplot, plm) would be required to reproduce the analyses.</p> <p>Hardware Requirements:</p> <p>While the specific hardware requirements will depend on the size of the dataset and the complexity of the analyses, the tasks described in the manuscript should be manageable with modest hardware specifications.</p> <p>For general data analysis tasks using R, a modern laptop or desktop computer with at least 4GB of RAM and a multi-core processor should be sufficient.</p> <p>If working with larger datasets or running more computationally intensive analyses, higher RAM and processor specifications may be required.</p>	
<i>Connections to other products of research</i>	The manuscript "Bacterial fertilizer and filtered sludge enhance soil quality and eucalyptus growth: A long-term field study" does not directly mention being published in Silva Fennica or provide DOIs for other related publications.	Author
<i>Personal data</i>	The materials used in the study contain personal data as defined in the typical sense (e.g., identifying information about individuals)	Author
<i>Confidential or secret data</i>	It does not appear that the material contains confidential or secret information in the sense of confidential business information or sensitive species information.	Author
<i>Publication date</i>	Date of publication in an archive or repository.	Archive/Repository/Publisher
<i>Preservation policy</i>	Preserving the material permanently ensures that the scientific findings of this important study are accessible to the broader scientific community and the public, fostering reproducibility, transparency, and potential future analysis. The authors can take responsibility for managing the material in a way that balances its long-term preservation with accessibility and usability.	Author
<i>Permanent identifier (PID)</i>	Unambiguous, permanent identifier of the material. The identifier may be DOI, URN or accession number.	Archive/Repository/Publisher