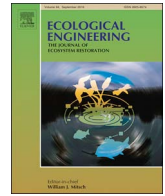




Contents lists available at ScienceDirect

Ecological Engineering

journal homepage: www.elsevier.com/locate/ecoleng

Special Issue Editorial

4th International Conference on soil bio- and eco-engineering (SBEE2016) 'The Use of Vegetation to Improve Slope Stability'

Thomas Hubble^{a,*}, Samantha Clarke^a, Alexia Stokes^b, Chris Phillips^c

^a School of Geosciences, University of Sydney, NSW, 2006, Australia

^b Inra, Amap, Ird, Cnrs, Cirad, University Montpellier, 34000 Montpellier, France

^c Landcare Research, Lincoln, 7608, New Zealand

ARTICLE INFO

Keywords:

Slope stability
Bioengineering
Ecological engineering
Modelling
Root reinforcement
Soil-Root interaction
Sustainability
Vegetation

ABSTRACT

This editorial describes a 10-paper special issue that arises from the 4th International Conference on Soil Bio- and Eco-Engineering (SBEE2016) 'The Use of Vegetation to Improve Slope Stability' held at the University of Sydney, Australia, in July 2016. The conference focused on current topics and progress in slope stability research and the successful application of soil bio-engineering and eco-engineering techniques to stabilizing slopes in a variety of climatic and geomorphic settings. The papers are divided into the following categories: vegetation and slope stability (1 paper); root-soil interactions (5 papers); slope stability modelling (2 papers); eco-engineering and land restoration (2 papers). Most of the papers present case studies documenting bio- and eco-engineering techniques, site-specific investigations or innovative slope stability modelling approaches and two papers are aimed at standardizing data collection and sustainability assessment practices within the discipline. Case studies are presented by scientific researchers, practitioners, geotechnical and civil engineers, biologists, ecologists, geomorphologists, and foresters from North America, Europe, South-East Asia, Australia, and New Zealand.

1. Introduction

Over the last century, a rapidly growing human population has driven ever-greater usage of hillslope terrains for agriculture and the exploitation of mountain forests for timber. When the effects of these two anthropogenic practices are coupled with the consequences of climate change, a common result is the severe degradation of mountainous and hilly regions around the world due to soil erosion and mass movement processes such as landslides. Once a landslide has occurred, or erosion processes are underway, the replacement of soil on the denuded slope can take thousands of years through natural processes. In a world where the population is expected to reach 9 billion by 2040, agricultural soil is precious and hillslope stability is now a priority for governments needing to feed rapidly increasing populations. Therefore, the prevention of slope instability, the restoration of degraded slopes and the correct management of steep, farmed hillslopes is of utmost importance. In response to the need to develop effective erosion mitigation and landslide prevention strategies, a number of research groups investigate the use of vegetation to improve slope stability and reduce soil erosion. Their collective efforts are largely focused on the development of data collection and modelling techniques which are used to better understand root-soil interactions at different scales and therefore

reliably assess proposed landscape restoration or management interventions that rely on the use of vegetation or reforestation. The aim of this work is to improve and inform best practice in hillslope soil and landscape management. A group of people who work in this field meet regularly to discuss advances they have made and lessons learned. The papers in this special issue focus on current problems in slope stability research, and they are addressed using soil bio- and eco-engineering techniques. They are based on work presented by the scientific researchers, practitioners, geotechnical and civil engineers, biologists, ecologists, geomorphologists, and foresters who work in this field and include case studies from North America, Europe, South-East Asia, Australia, and New Zealand.

1.1. SBEE2016

The papers in this special issue are the result of presentations from the 4th International Conference on Soil Bio- and Eco-Engineering (SBEE2016) 'The Use of Vegetation to Improve Slope Stability' held at the University of Sydney, Sydney, Australia on 11–14 July 2016 (Table 1). SBEE2016 provided a forum for over 80 delegates from 20 countries to focus on current problems in slope stability research, and how to address them using soil bio- and eco-engineering techniques.

* Corresponding author.

E-mail address: tom.hubble@sydney.edu.au (T. Hubble).

<https://doi.org/10.1016/j.ecoleng.2017.11.003>

Received 9 November 2017; Accepted 10 November 2017

0925-8574/ © 2017 Elsevier B.V. All rights reserved.

Table 1

Presentations at SBEE2016 in the Special Issue Soil Bio- and Eco-Engineering (SBEE2016) ‘The Use of Vegetation to Improve Slope Stability’, held in Sydney, Australia, 11–14 July 2016. Speaker is indicated by * for multiple-author presentations.

Title of Presentation	Oral presentation, poster, or workshop	Presenter	Session
Sustainability performance of ecoengineering measures	Oral	S.B. Mickovski* and C. Thomson School of Engineering and Built Environment, Glasgow Caledonian University, Glasgow, Scotland, United Kingdom	Eco-engineering and land restoration
Soil aggregate stability on ultramafic substrate in New Caledonia: untangling the effect of sesquioxides, soil organic carbon, root traits and ectomycorrhiza in five plant communities	Oral	J. Demenois*, F. Carriconde, F. Rey, A. Stokes, AgroParisTech, INRA (UMR AMAP) – Irstea (UR EMGR) – IAC (Axe 2), Centre IRD de Nouméa, BP 18239, 98 800 Nouméa, New Caledonia.	Root-Soil Interactions
The role of cultivated grapevines on slope stability	Oral	A. Cislighi, M. Bordoni, C. Meisina, G.B. Bischetti* Dep. of Earth Sci., Università degli Studi di Pavia, Via Ferrata	Vegetation and Slope Stability
Soil texture and root architecture effects on concentrated flow erosion rates	Oral	W. Vannoppen*, J. Poesen, S. De Baets KU Leuven, Division of Geography and Tourism, Celestijnenlaan 200, B-3001 Heverlee, Belgium	Root-Soil Interactions
Desirable Plant Functional Traits for Hydrological Reinforcement of Slopes	Oral	D. Boldrin*, A. K. Leung, A. G. Bengough, School of Science and Engineering, University of Dundee, Dundee, UK	Root-Soil Interactions
Realistic scaling of plant root systems for centrifuge modelling of root-reinforced slopes	Oral	T. Liang*, A.G. Bengough, J.A. Knappett, D. MuirWood, K.W. Loades, P.D. Hallett School of Science & Engineering, University of Dundee, Dundee, UK.	Slope Stability Modelling
Root morphology and biomechanical characteristics of high altitude alpine plant species and their potential applications in soil stabilization	Oral	C. Hudek*, C.J. Sturrock, B.S. Atkinson, S. Stanchi, M. Freppaz, University of Torino, DISAFA, Largo Paolo Braccini, 2, 10095 Grugliasco (TO), Italy	Root-Soil Interactions
Assessment of decay of silver fir logs exposed to outdoor conditions by near infrared spectroscopy and vibration resonant methods	Poster	J.B. Barré *, F. Bourrier, D. Bertrand, F. Rey, Université Grenoble Alpes, Irstea, UR EMGR, France	Eco-engineering and land restoration
Use of LAPSUS_LS model to investigate vegetation influence on catchment slope stability – A case of study in Llano Bonito, Costa Rica	Poster	L.M.W. Rossi *, B. Rapidel, O. Rouspard, M. Villatoro, C. Roumet, Z. Mao, K. Metselaar, J.M. Schoorl, L. Claessens, A. Stokes, INRA, UMR AMAP, 34398, Montpellier Cedex 5, France,	Slope stability modelling
Methods to measure the mechanical behaviour of tree roots: A review	Workshop	F. Giadrossich, M. Schwarz, D. D. Cohen, A. Cislighi, C. Vergani, T.C.T. Hubble, C. Phillips, A. Stokes	Root-Soil Interactions



Fig. 1. Presenters and Participants at the 4th International Conference on Soil Bio- and Eco-Engineering (SBEE2016) ‘The Use of Vegetation to Improve Slope Stability’ at the University of Sydney, Sydney, Australia, 11–14 July 2016.

Download English Version:

<https://daneshyari.com/en/article/8848154>

Download Persian Version:

<https://daneshyari.com/article/8848154>

[Daneshyari.com](https://daneshyari.com)