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Field of Study: **SOIL MICROORGANISM**

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ABSTRACT

Vegetation cover, especially grasses, is proven to have a significant contribution for slope stabilization. Nitrogen fixing bacteria supply some amounts of nitrogen (N) required by slope grasses for proper growth and development. In this study, three slopes were chosen based on their soil strengths namely slope A (130-140 kPa), B (80-100 kPa) and C (50-70 kPa). This study showed that the more stable slopes will also have a lower soil saturation level. There was a positive relationship between sizes of bacterial populations with soil saturation level ($r^2 = 0.60$, $p<0.05$). Similar correlations were also observed between soil shear strength with soil saturation levels ($r^2 = 0.58$, $p<0.05$) as well. Culturable nitrogen-free living bacteria were isolated and enumerated from roots of *Axonopus compressus*, a slope grass using Burk's nitrogen-free medium. The diversity of free-living nitrogen fixing bacteria was initially determined by the REP-PCR and ERIC-PCR fingerprinting method. Results indicated that REP-PCR give better variable. Hence, the method was used throughout the study. Dendograms were constructed from REP-PCR profiles of a total of 31 strains. The cluster analysis indicated that the diversity of nitrogen-fixing bacteria on the grass roots was quite high and closely related among the population. The information about the presence of nitrogen-free fixing bacteria will greatly assist future management of vegetation to stabilise slopes.

ABSTRAK

Litupan tumbuhan, terutamanya rumput, telah dibuktikan mempunyai kesan yang signifikan ke atas kestabilan cerun. Bakteria pengikat nitrogen membekalkan sebahagian daripada nitrogen (N) yang diperlukan oleh rumput cerun untuk pembiakan dan pertumbuhan yang sempurna. Dalam kajian ini, tiga cerun telah dipilih berdasarkan perbezaan kekuatan ikatan tanah dan dinamakan sebagai cerun A (130-140 kPa), B (80-100 kPa) dan C (50-70 kPa). Kajian ini telah mengukuhkan lagi kenyataan bahawa cerun yang lebih stabil mempunyai aras ketepuan tanah yang lebih rendah. Terdapat hubungkait yang positif di antara saiz populasi bakteria dengan aras ketepuan tanah (r^2 = 0.60, $p<0.05$). Hubungkait yang sama juga dapat diperhatikan antara kekuatan ikatan tanah dengan aras ketepuan tanah (r^2 = 0.58, $p<0.05$). Bakteria pengikat nitrogen bebas yang boleh dikultur telah diasingkan daripada akar rumput *Axonopus compressus* menggunakan media bebas nitrogen Burk's. Pada awalnya, kepelbagaian bakteria pengikat nitrogen bebas ditentukan dengan menggunakan kaedah REP-PCR dan ERIC-PCR Keputusan telah menunjukkan bahawa kaedah REP-PCR memberikan hasil yang lebih baik. Justeru itu, kaedah tersebut telah digunakan dalam kajian selanjutnya. Dendogram telah dihasilkan dari profil REP-PCER yang terhasil daripada sejumlah 31 strain. Analisis kluster menunjukkan bahawa kepelbagaian bakteria pengikat nitrogen pada akar rumput adalah agak tinggi dan mempunyai hubungan yang hampir dalam kalangan populasi tersebut. Maklumat berkaitan kehadiran bakteria pengikat nitrogen bebas adalah amat berguna dalam pengrusan tumbuhan untuk kestabilan cerun.

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LIST OF ABBREVIATIONS

%	percent sign
º C	degree Celsius
ATP	Adenosine triphosphate
bp	base pair
Ca	Calcium
cm	centimeter
Cfu	Colony forming unit
DNA	Deoxyribonucleic acid
ddNTP	Dideoxynucleoside triphosphate
ERIC	Enterobacterial repetitive intergeneric concencus
et al.	*et alia*
EtOH	ethanol
FC	Field capacity
g	gram
i. e.	*id est*
kPa	kiloPascal
m	meter
M	molar
Mbp	Megabasepairs
$MgSO_4$	Magnesium sulphate
min	minute
ml	milliliter
Max	Maximum
Mg	Magnesium
$MgSO_4$	Magnesium sulphate

mRNA	Messenger ribonucleic acid
N	Nitrogen
NaCl	Sodium chloride
NaOH	Natrium hydroxide
No.	Number
PCR	Polymerase chain reaction
RC	Rojo Congo red medium
REP	Repetitive extragenic palindromic
RNA	Ribonucleic acid
sp	species
SWC	Soil water content
TBE buffer	Tris-Borate-EDTA buffer
TE buffer	Tris EDTA buffer
UV	ultraviolet
µl	micro liter