

Effects of deforestation on soils from Guinea-Bissau



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INTRODUCTION

Agriculture is a major driver of soil biodiversity decline globally, with in turn can have negative effects on the performance and stability of soil ecosystems functions, such as soil fertility, essential for plant development.

In tropical regions, deforestation for conversion of land to pastures and plantations is occurring at a very high rate, but there is still little information on how this impacts soil biodiversity.



Therefore, this study aims to investigate how land use change, namely the forest-to-plantation conversion, changes soil parameters and functional microbial communities involved on nutrient cycling, in a tropical region of Guinea-Bissau.

OBJECTIVES

HOW LAND USE CHANGE AFFECTS THE SOIL BIOCHEMICAL PROPERTIES?

HOW LAND USE CHANGE AFFECTS THE SOIL MICROBIOME?

HOW LAND USE CHANGE AFFECTS THE MICROBIAL COMMUNITIES INVOLVED IN NUTRIENT CYCLING?

METHODOLOGY

SOIL SAMPLING SITES

NATIVE FOREST



WET SEASON

CASHEW ORCHARD



PEANUT FIELD



DRY SEASON



SOIL ANALYSIS

BIOCHEMICAL PARAMETERS

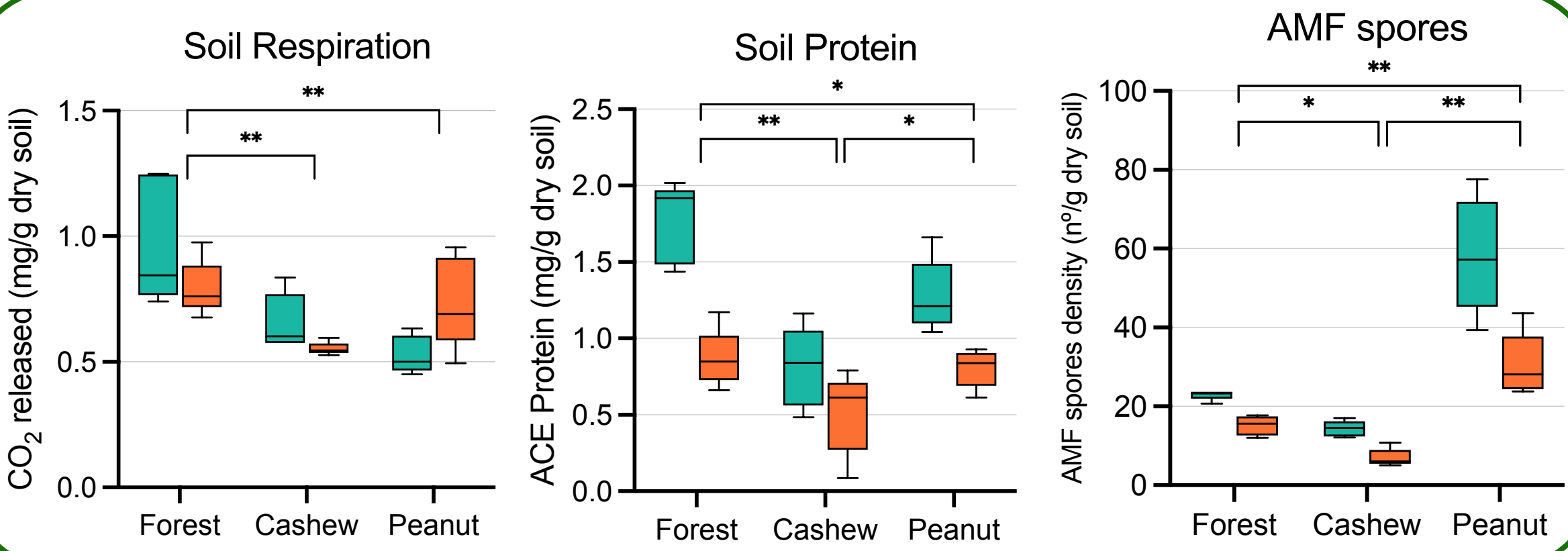
Kjeldahl nitrogen
Active carbon
Organic carbon
 P_2O_5
pH
 $N-NO_3^-$
 $N-NH_4^+$
Water content

BIOLOGICAL PARAMETERS

Functional genes involved in N, P and C cycling
AMF spore density
PLFAs (Phospholipid Fatty Acids)
Soil protein
Soil respiration
Enzyme assays

RESULTS

Microbial biomass

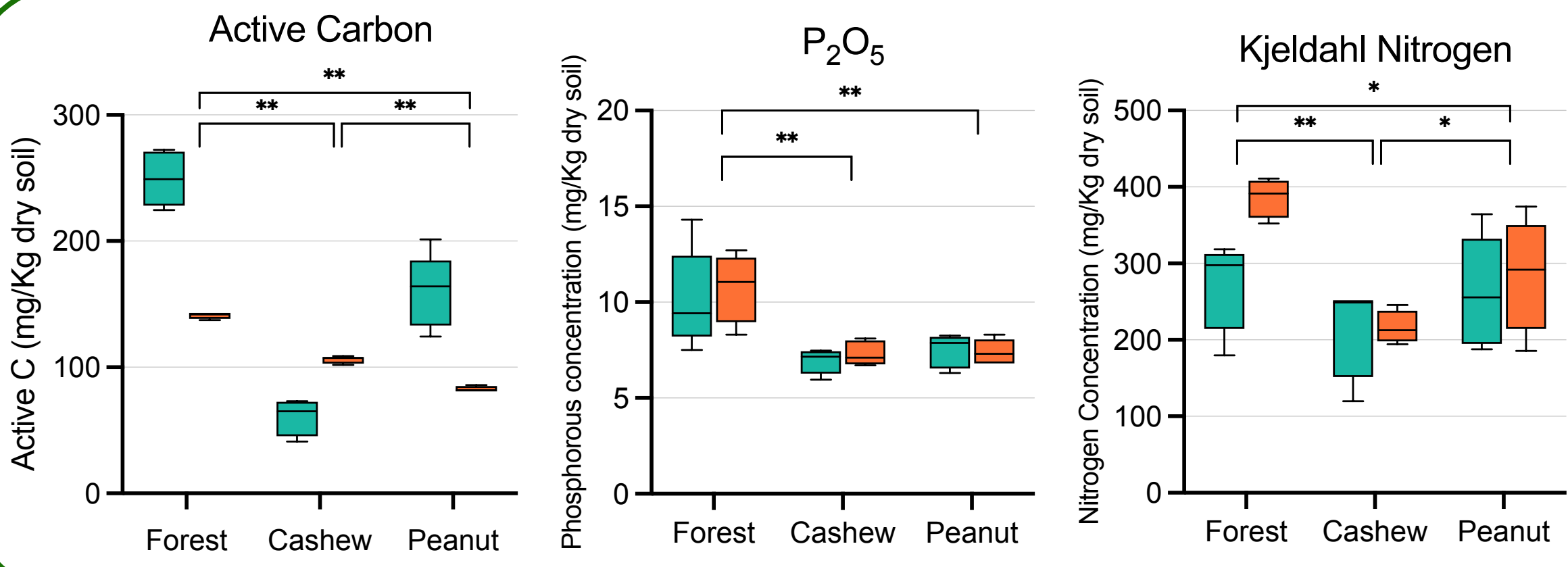


MORE GRAPHS

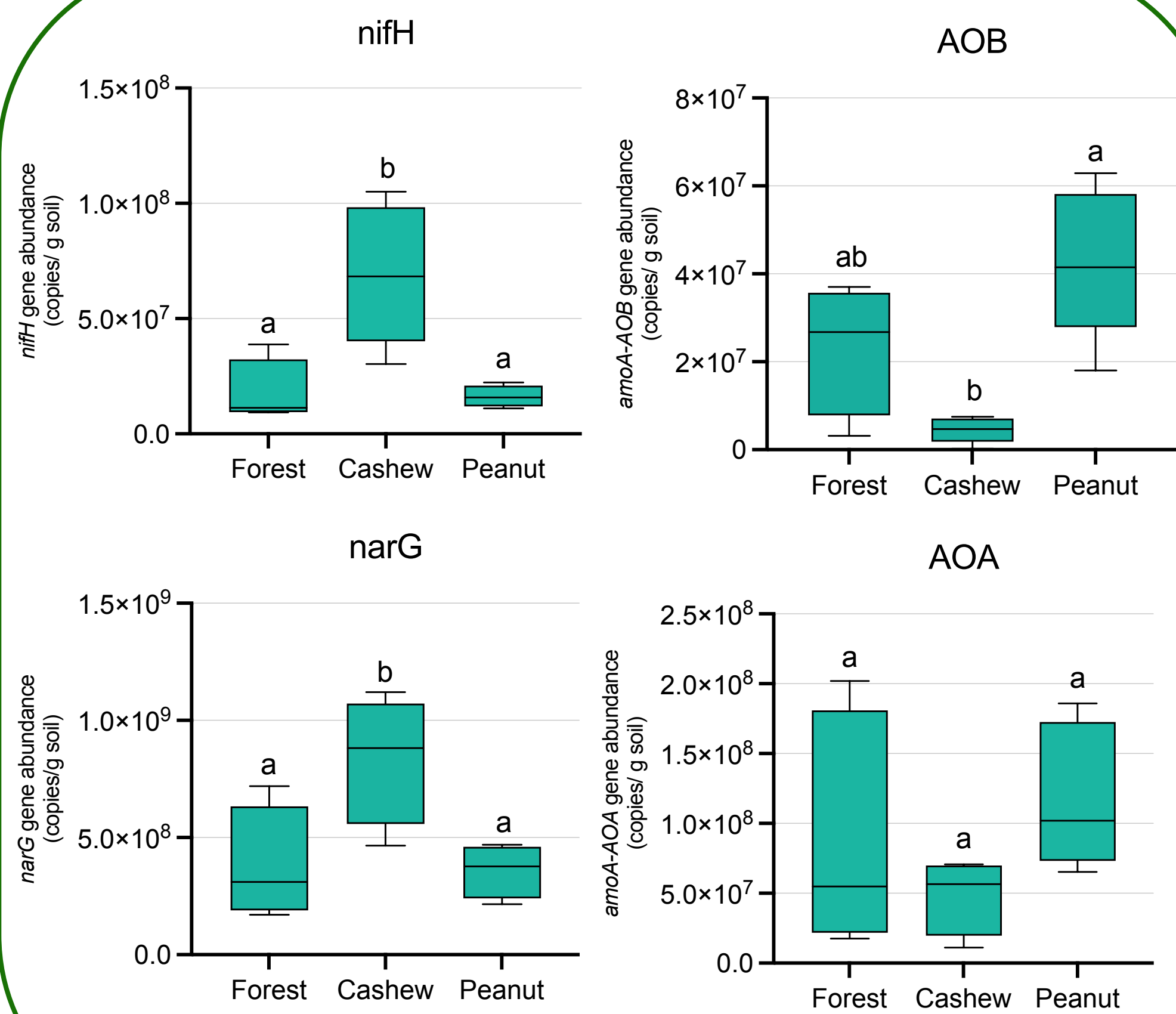


Wet Season
Dry Season

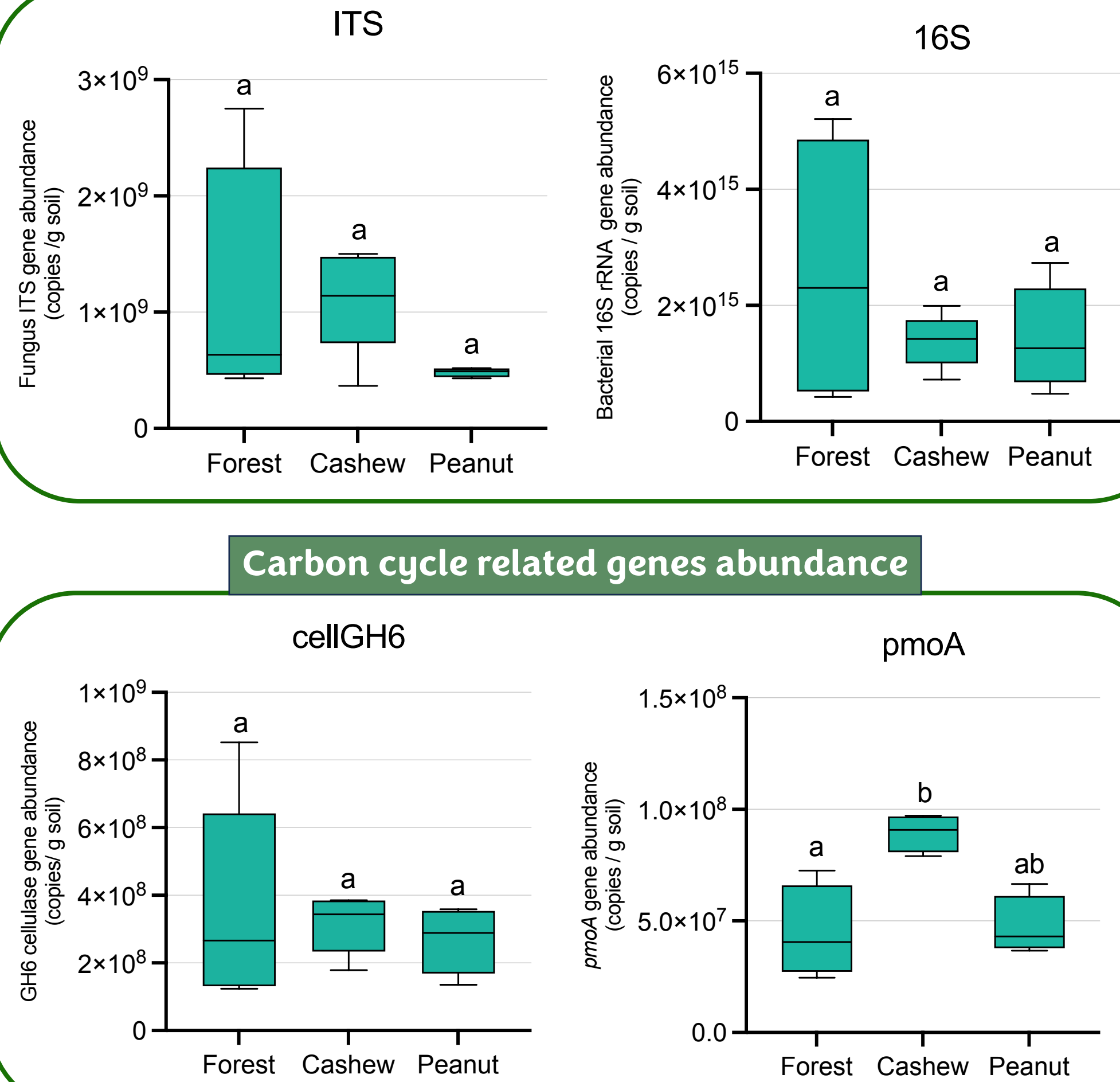
Soil biochemistry



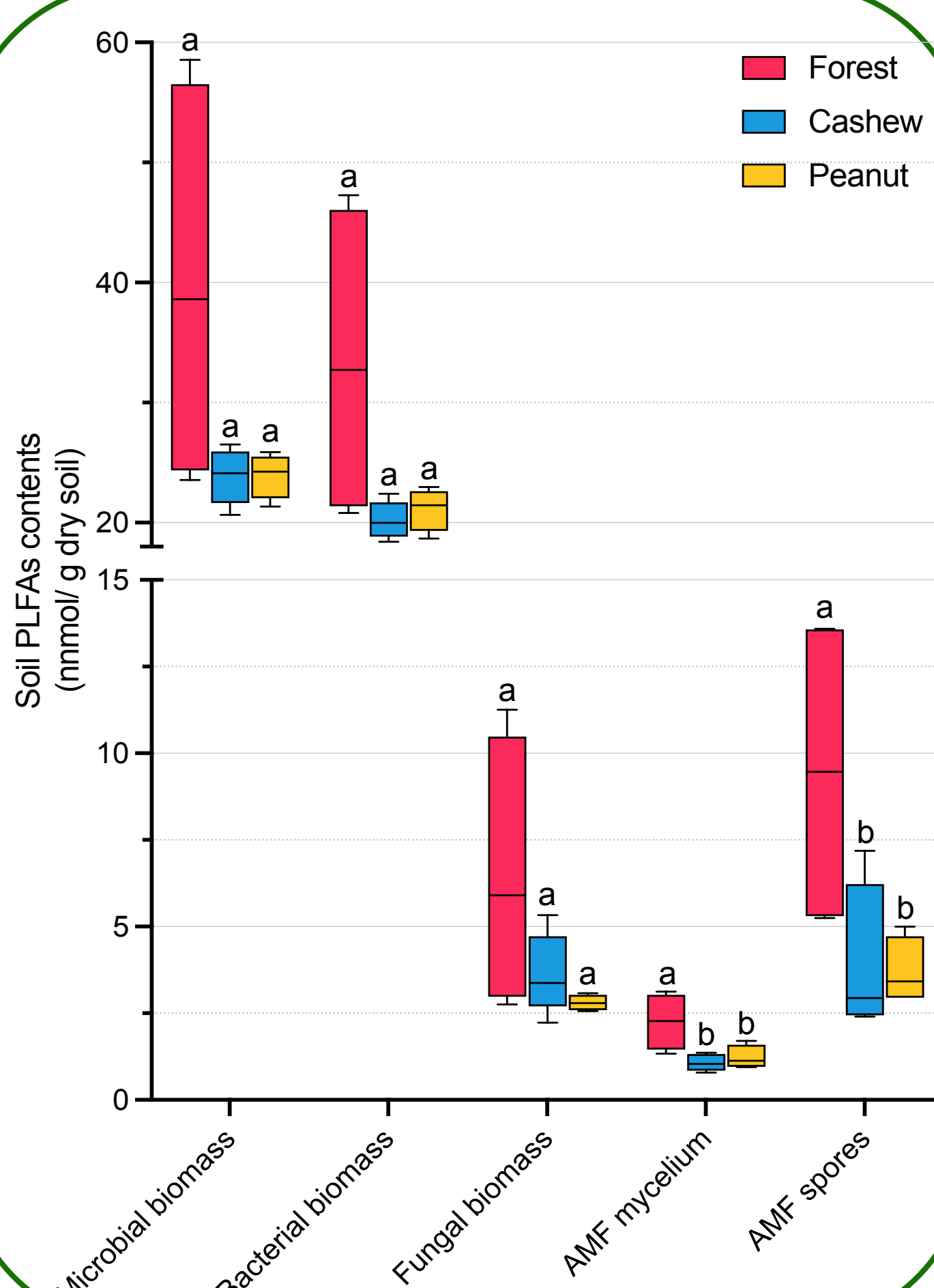
Nitrogen cycle related genes abundance



Fungal and bacterial gene abundance



Soil PLFAs



TAKE-HOME MESSAGES

1

Land-use change altered soil parameters, with forest soils showing higher values for most of the parameters evaluated.

2

Forest-to-plantation transition led to changes in the soil microbial communities, including those involved in nutrient cycling.

3

Seasonality and the interaction of season with land-use change alters soil chemical and biological parameters.

4

Conversion of a forest to a crop field is associated with a decline in soil biodiversity and soil quality.