

Nitrogen sources of *Brachiaria* spp. in tropical pastures

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Tropical pastures in the Colombian Amazon

1950s
Slash and burn
of forest



Subsistence
crops



Opening of
new grazing
areas

1-2 years



Sowing of grasses
Mainly *Brachiaria* spp.



Pasture degradation
- Low productivity
- Loss of nutrients



Unsustainable management
- Overgrazing
- Lack of maintenance fertilization



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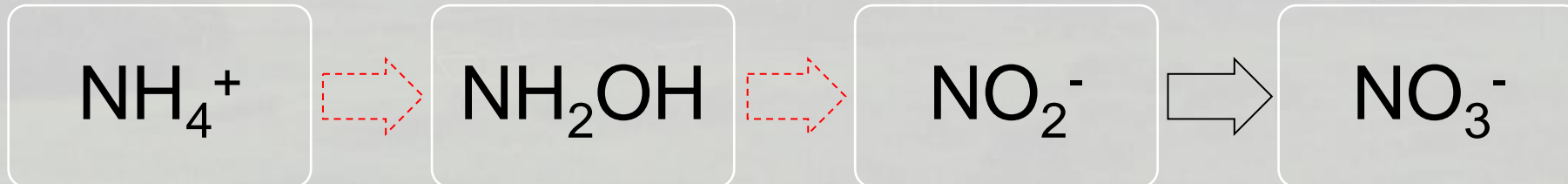
Integrating nitrogen fixing legumes

- Increase in nitrogen (N) uptake and biomass production
- Positive effect on forage quality



Negative impact on the environment through losses

***Brachiaria* spp. with biological nitrification inhibition (BNI) potential**



Enhance sustainability of tropical pastures

Study region

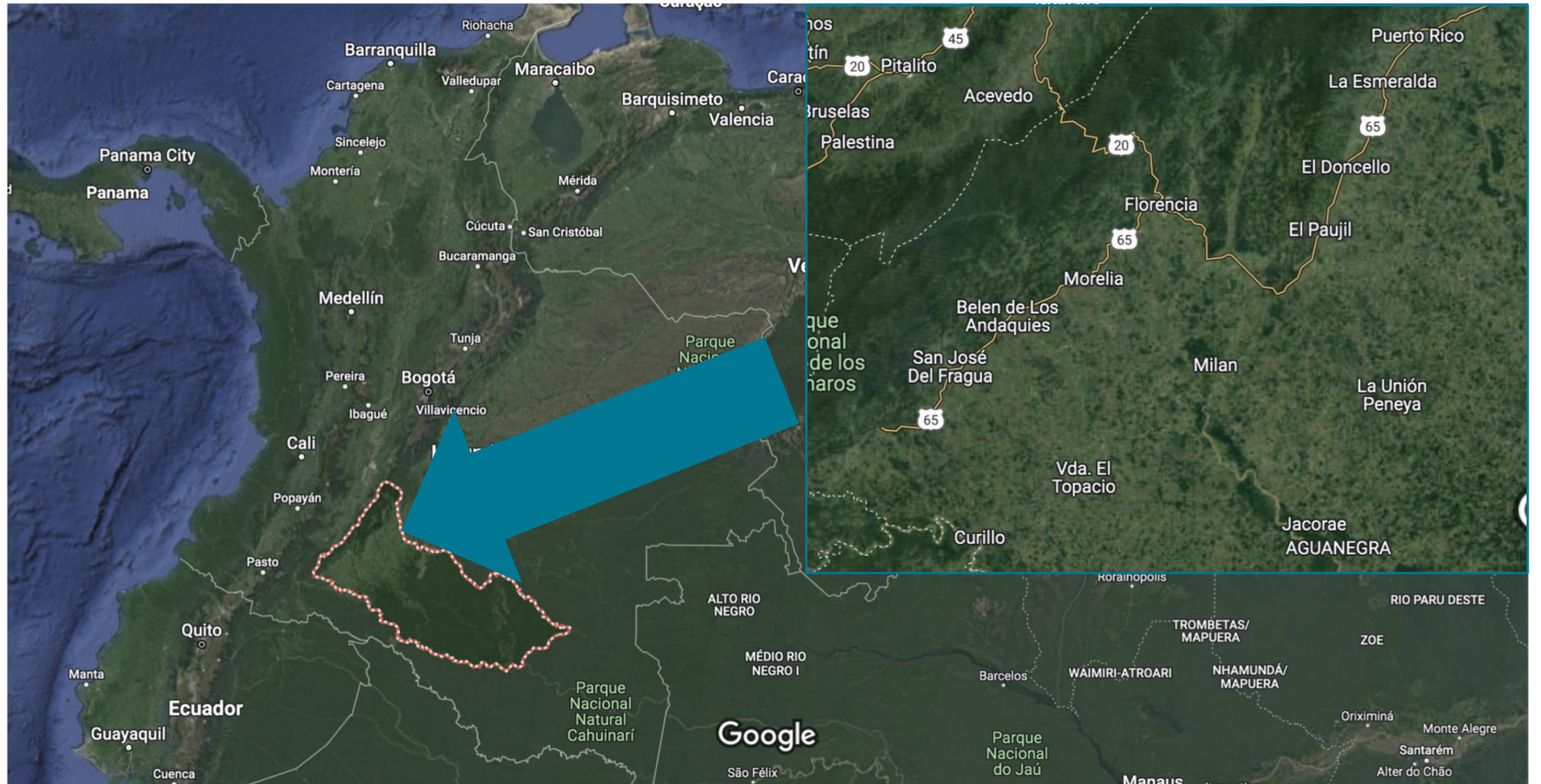
- Departement Caquetá
- Andean-Amazon Piedmont
- Ondulating landscape with forest patches
- Farm size \varnothing 50 ha



\varnothing 25.8 °C
max 31 °C
min 21 °C



3'758 mm



Bilder © 2023 TerraMetrics, Kartendaten © 2023 Google 200 km

Bilder © 2023 TerraMetrics, Kartendaten © 2023 Google 20 km

Pasture types

B. brizantha

B. decumbens

B. humidicola

Grass alone (GA)



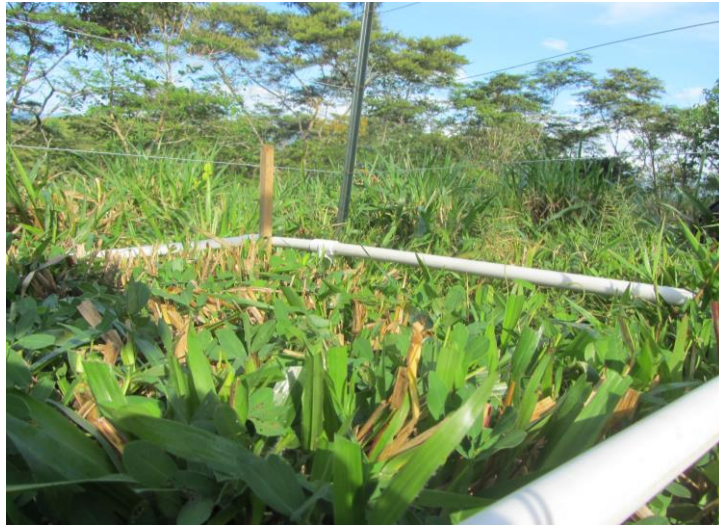
Grass legume (GL)



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BNI potential

Normalization of the plots



Harvest and separation



Drying and weighing



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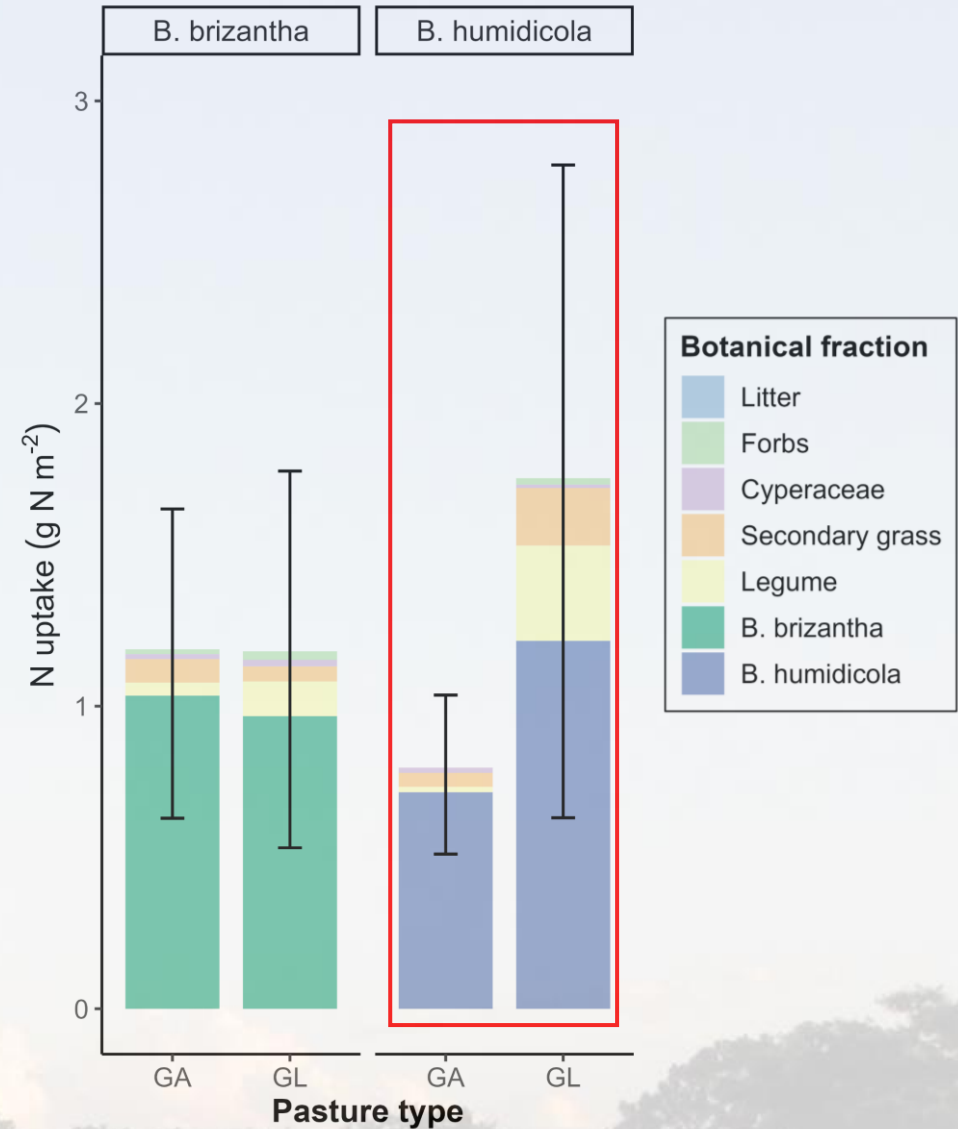
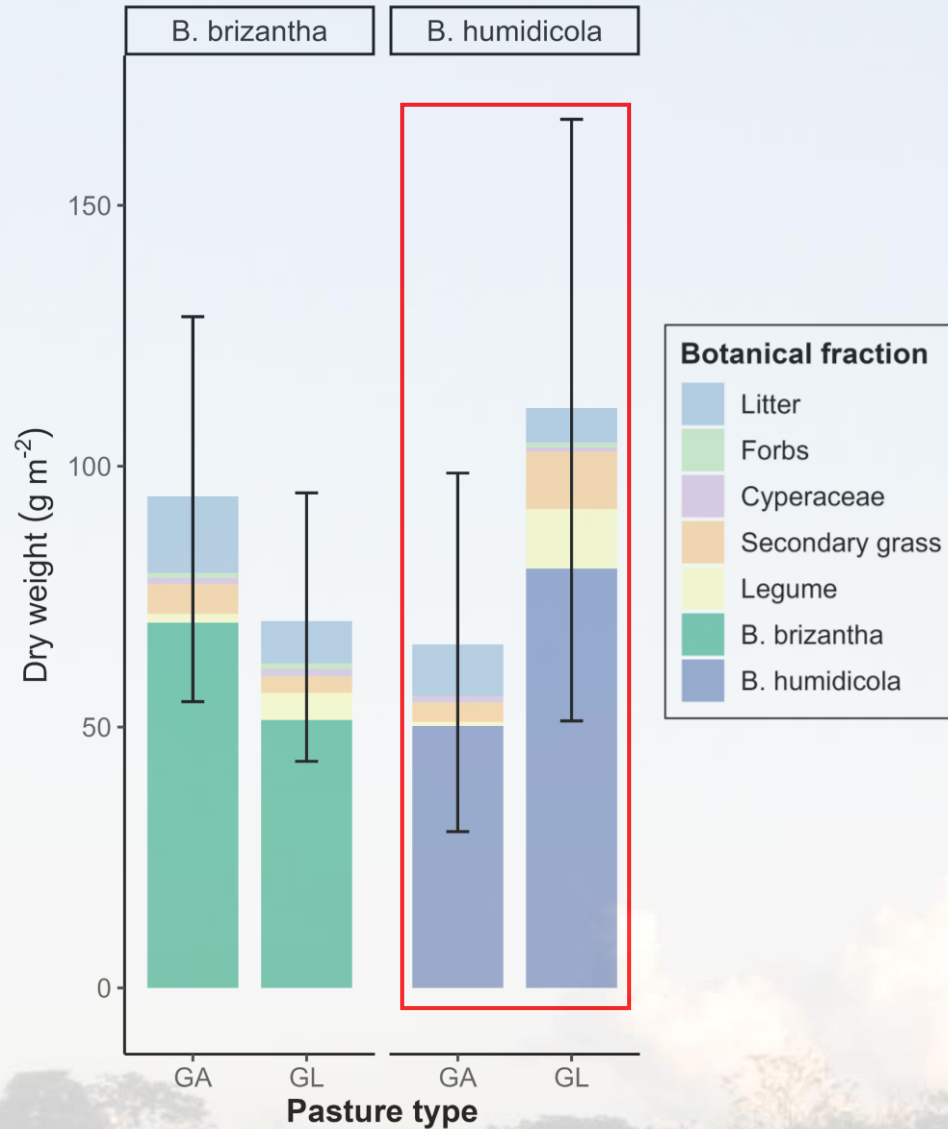
Soil sampling and
PRS[®] probes
collection



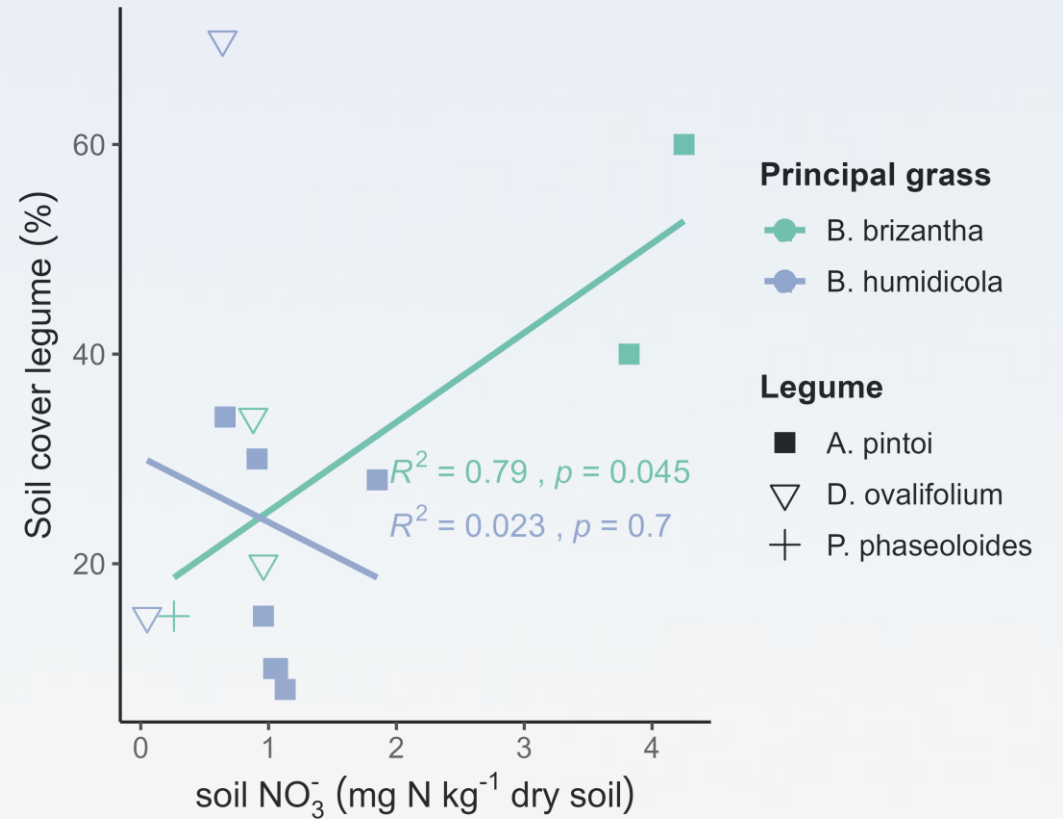
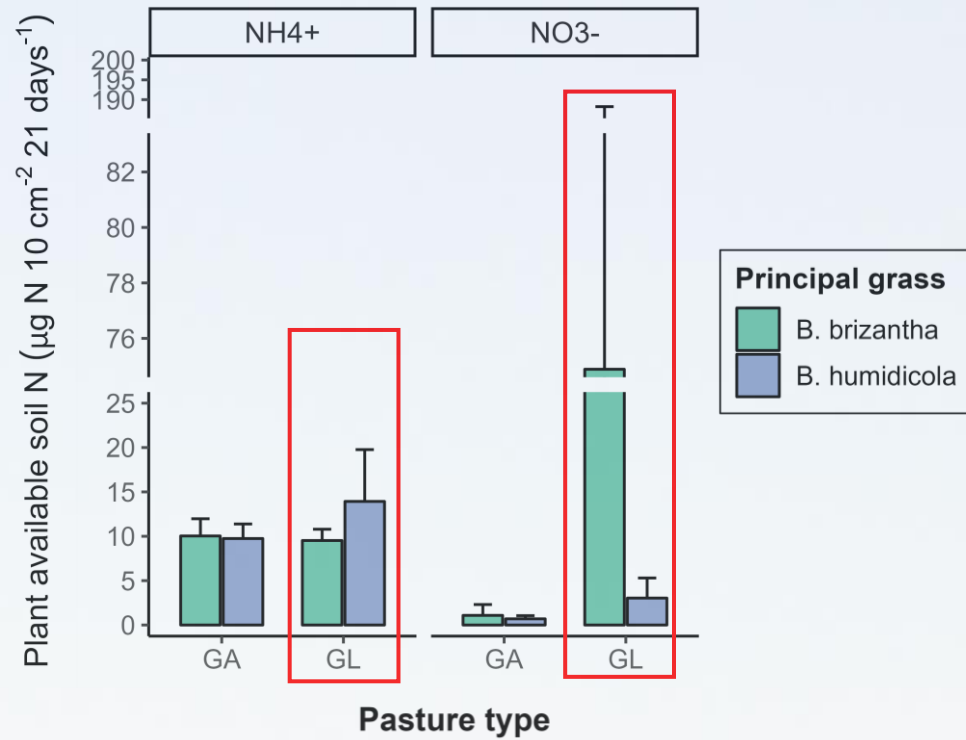
Chemical analysis

- Total N of botanical fractions
- Soil mineral N pool (NH_4^+ and NO_3^-) 0-10 cm
- Plant available NH_4^+ and NO_3^- with PRS[®] probes 0-10 cm

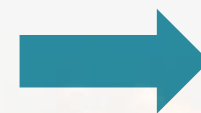
Increased biomass production and N uptake under high BNI



Indications of reduced nitrification under high BNI



- Slightly higher ammonium in GL pastures with high BNI
- Higher nitrate in GL pastures with *B. brizantha*



Indication of reduced nitrification with *B. humidicola*

Conclusions

- Nitrogen-fixing legumes increase total yield and N uptake in GL mixtures compared to GA pastures



- Reduced nitrification in *B. humidicola* suggests reduced losses (i.e., N₂O and NO₃⁻ leaching)



Outlook

- Measure specific N losses (e.g., N₂O)
- Collect management information to derive site-specific adoption
- Development of management recommendations to extrapolate innovations to other farms in the region

Muchas gracias por su atención



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