

ómica

A stylized graphic on the right side of the page. It features a white DNA double helix structure that curves upwards and to the right. The top of the helix is filled with a pattern of binary code (0s and 1s) and a series of white circles of varying sizes, suggesting a digital or data-driven theme.

El futuro
es de todos

Gobierno
de Colombia



N₂O Emissions From Sugarcane Cultivated Soils in the Cauca River Valley, Colombia.

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**Virtual Symposium in
Plant Omics Science 2020**





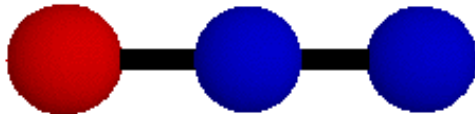
CONTENT

- Introduction
- Materials and methods
- Results

Relevance of Nitrous Oxide (N₂O)

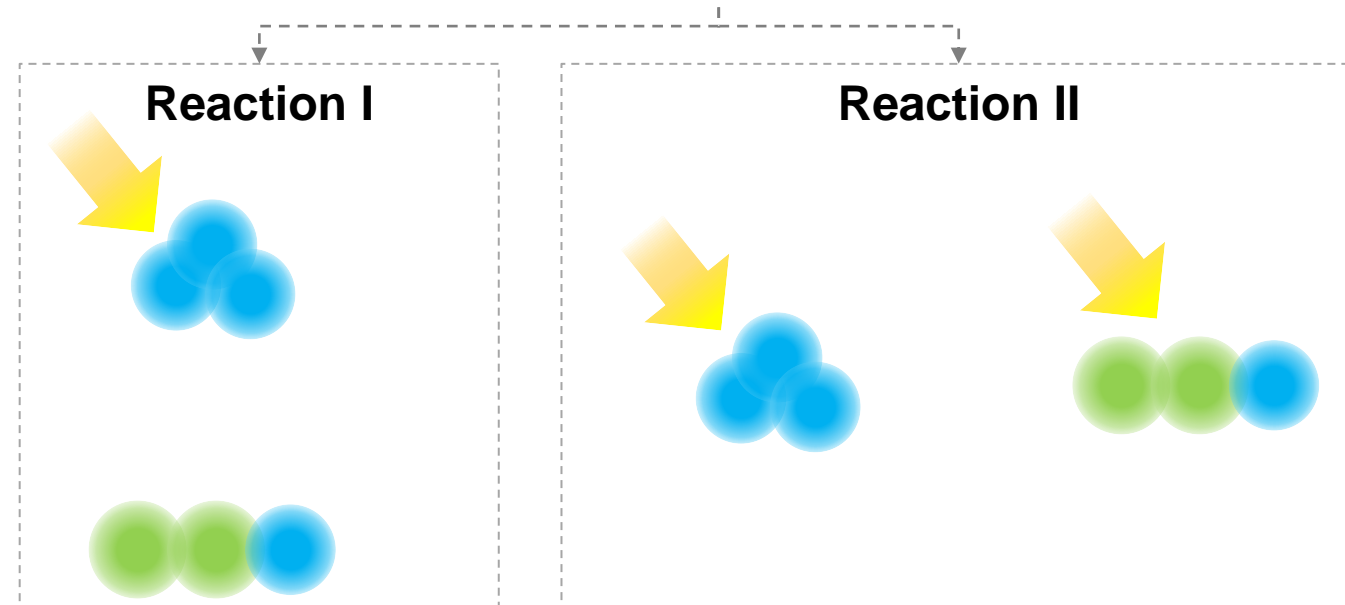
N₂O is a **greenhouse gas** and its importance is attributed to three **physicochemical characteristics**.

It is a molecule with the capacity to absorb infrared radiation is ~310 times greater than that of CO₂ over a period of 100 years.



It is a chemical compound that can be stable in the atmosphere for up to ~114 years.

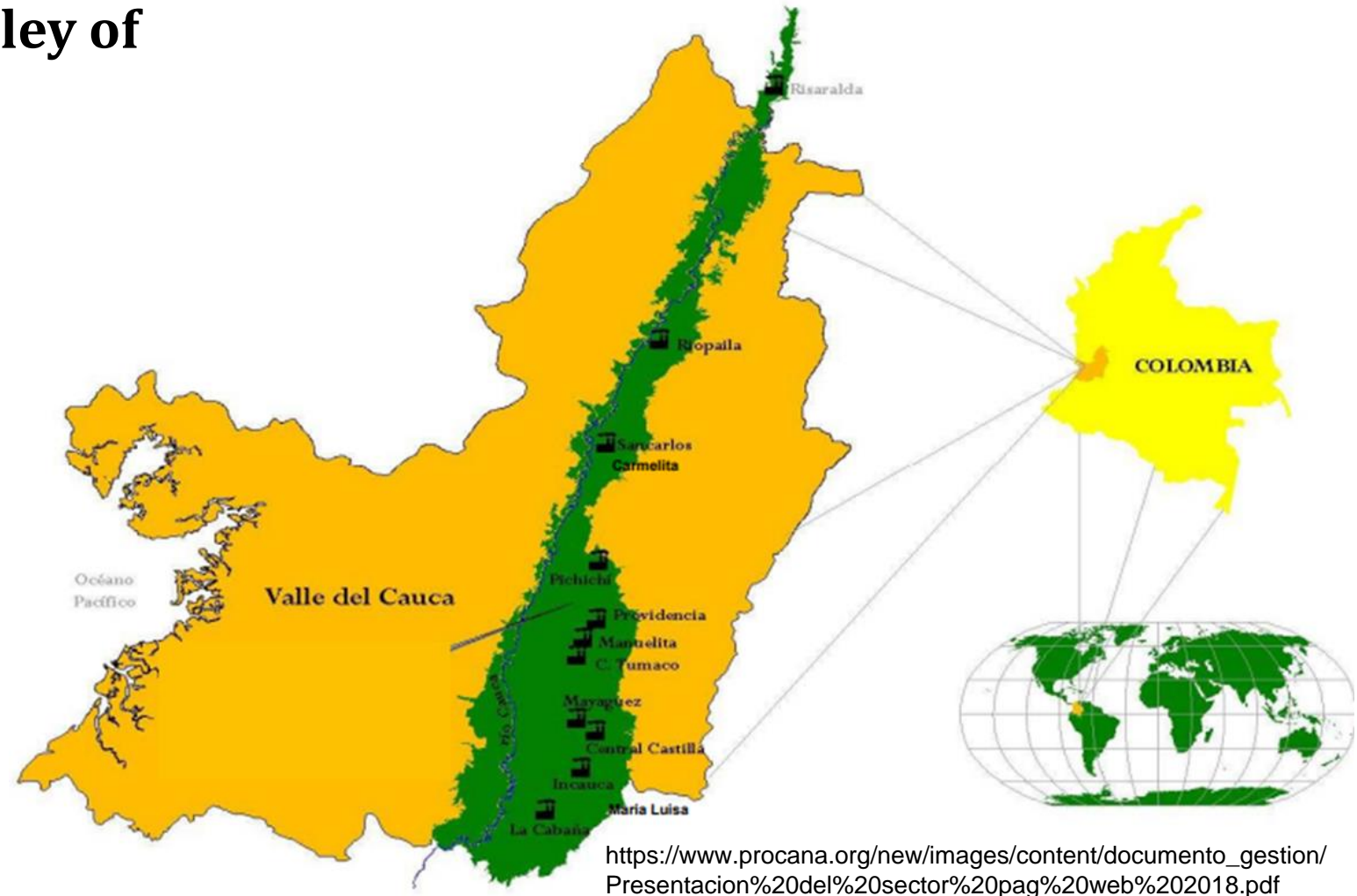
It degrades stratospheric ozone because it reacts with the monoatomic oxygen (O^{-D}) that is released during ozone photolysis (O₃).



27% of direct N₂O emissions are of anthropogenic origin, 80% of anthropogenic emissions are the result of inefficient use of nitrogenous fertilizers.

Sugarcane production in the Valley of the Cauca river.

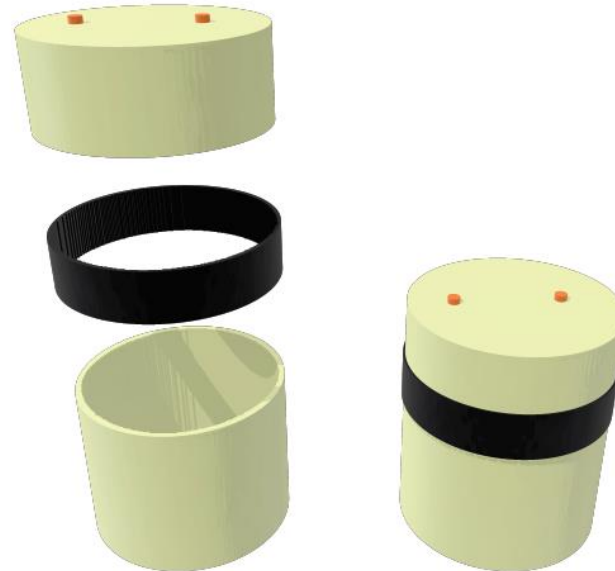
In Colombia during the year 2019, ~500.100 hectares were reported to be cultivated with sugar cane (MinAgriculture, 2020), **approximately 50% of the planted area (~250.000 ha) is concentrated in the Cauca river valley** developed under a highly technical intensive model in which it is recommended to apply, on average, 100 N kg ha⁻¹.



Materials and methods.

Ubication

(“-76.28315 W-3.67431 N” and
“-76.28450 W-3.67039 N”)



Direct field measurement
(Manual Static Chambers)

**Determination of the
concentration in the laboratory**
(Gas chromatograph)

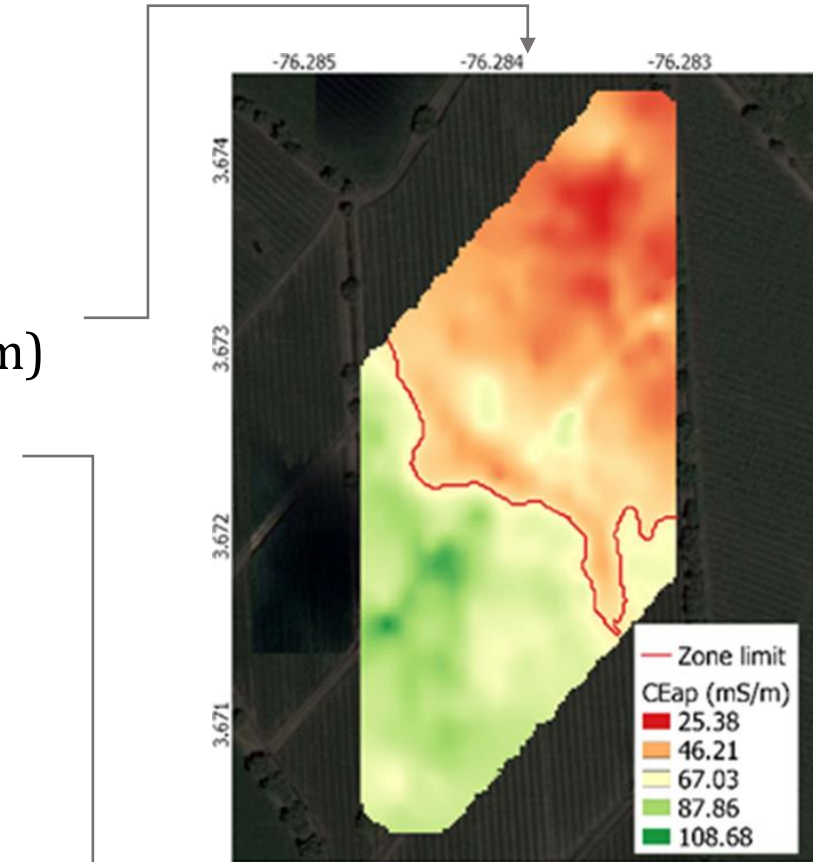
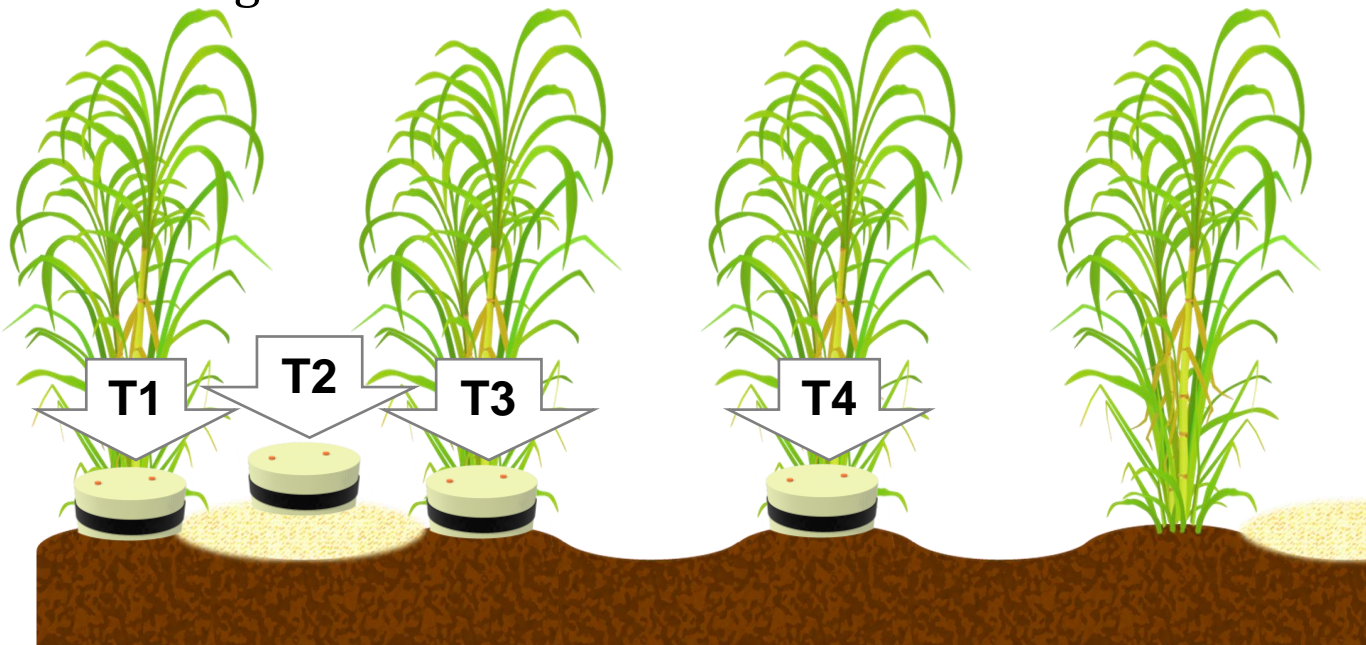


Experimental design

2X4 factorial design

Factor 1: Two zones with different apparent electrical conductivity (Zone 1 = ~ 25.38 and Zone 2 = ~ 87.86 mS/m)

Factor 2: Four sites within the crop depending on the nitrogen source



T1 (Control) = Furrow, 12 Kg trash m⁻²
T2 = inter Furrow, 24 Kg trash m⁻²
T3 = Furrow, 12 Kg trash m⁻² + 30 g N m⁻²
T4 = Furrow, 30 g N m⁻²

Data collection on the crop



Manual Static Chambers installed: 38
(22 en la “zona 1” y 16 en la “zona 2”)

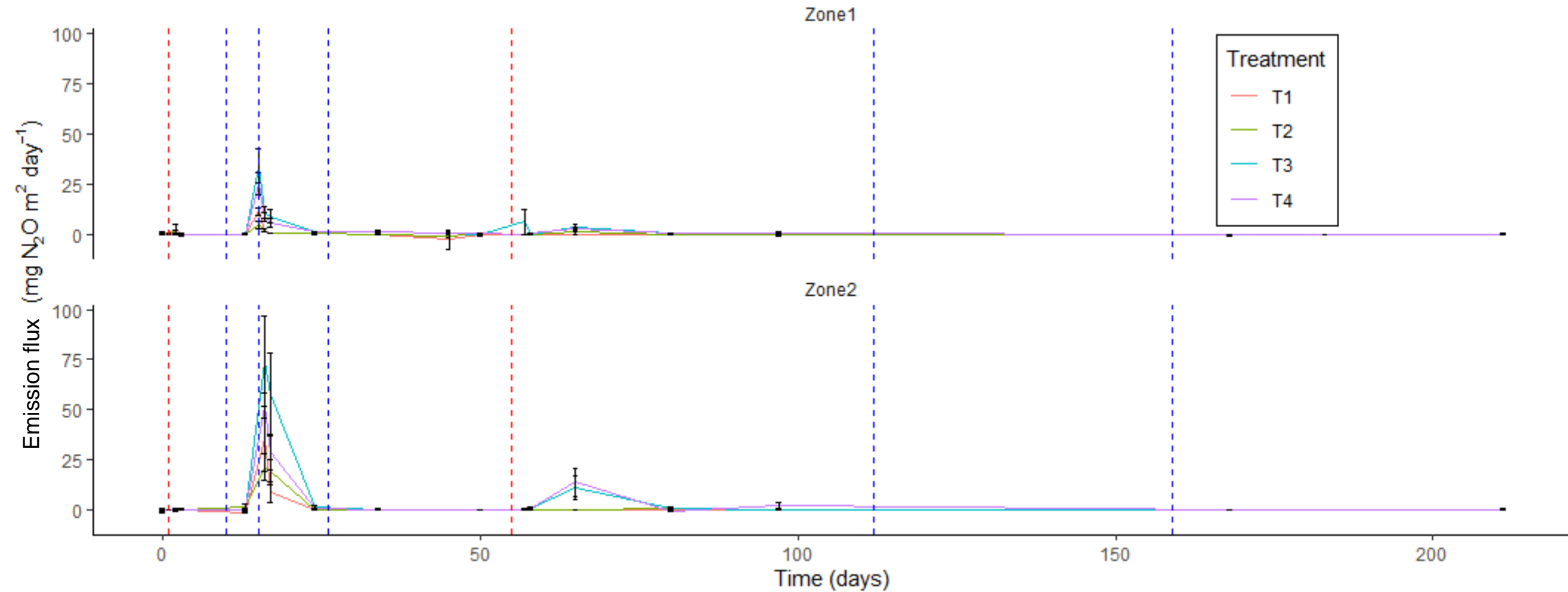
Monitoring : 21

Number of samples collected : 2868



Results.

N₂O emission flux



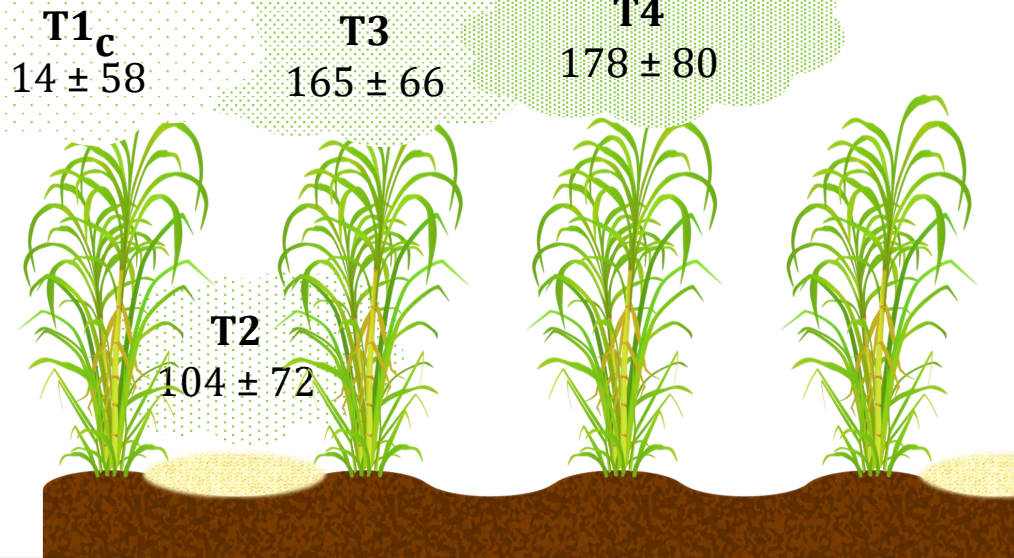
Results.

Cumulative emission of N₂O in 211 days (mg N₂O m⁻²)

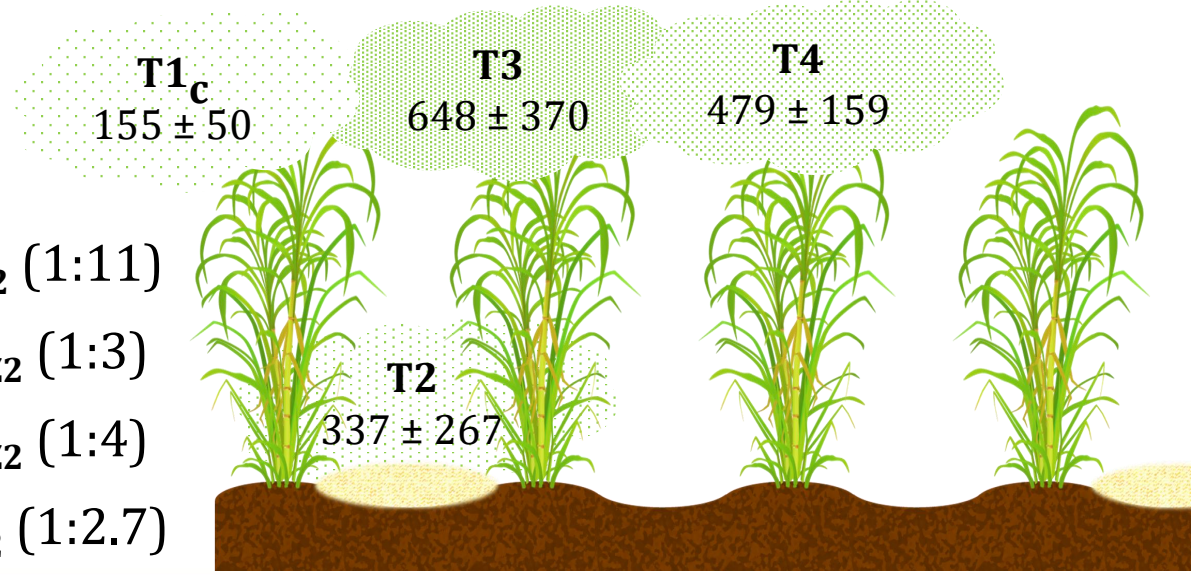
Mean Zone 1
145 ± 83

Mean Zone 2
466 ± 317

Z1 < Z2 (1:3)



T1_{Z1} < T1_{Z2} (1:11)
T2_{Z1} < T2_{Z2} (1:3)
T3_{Z1} < T3_{Z2} (1:4)
T4_{Z1} < T4_{Z2} (1:2.7)



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Aliados



IES Ancla



Apoyan



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