

Soil chemical parameters of native and non-native tree-invaded subtropical forest plots, Horco Molle, Tucumán, Argentina, 2023

EXPERIMENTAL DESIGN AND FIELD PROTOCOLS

The data resource consists of soil chemical measurements for two aims: 1) to characterise soils of plots where we conducted management experiences to restore secondary forests affected by invasions, and 2) to assess the impacts of tree invasions on the chemical and physical-chemical parameters of soils., by comparing native and invaded forest plots. The invaded forests are dominated by Glossy privet (*Ligustrum lucidum*). All plots were established on native or invaded sub-tropical mountain secondary forests (Yungas) in the Horco Molle experimental reserve and Parque Sierra de San Javier (Horco Molle), Tucumán, Argentina.

We took samples from the six geo-referenced plots we established in July 2020 for the first aim (see dataset “Tree census data from secondary subtropical forests invaded by *Ligustrum lucidum*, Horco Molle”, Argentina, 2020 - 2023. Each plot is 240 metres by 140 metres, 3.36 hectares for each plot (location specified in the related dataset). For the second aim, we also included plots that belong to the Red Subtropical de Parcelas Permanentes (Ceballos et al., 2022). Those plots are 1 ha each (100 m by 100 m) and were established in 1991, and trees are censused every five years.

Litter survey

In each plot, we took litter samples at five to seven points at random within the plot, distanced by 10 meters at least. At each point, we removed live organisms and then collected all the litter covering the soil in plastic bags in a quadrat of 0.25m² (Fig 1). The samples were taken to the laboratory and dried in an oven at 60°C until we obtained constant weight.



Fig1: Litter survey with a metal quadrat. All living materials were removed prior to the survey.

Soil survey

Before collecting soil samples, the upper soil layer was scraped off to remove litter. Soil samples were collected at different depths: 0-10, 10-30, 30-50 cm with a soil auger). At some points, the latest depth was unfeasible due to the presence of coarse materials (stones). At the same depths, soil samples were taken to determine bulk density using a soil core cylinder method, except in the cases with a proportion of coarse material (stony soils). In these situations, soil bulk density was determined based on the excavation method.

Soil samples were stored in sealed plastic bags and transported to the laboratory where they were air-dried and sieved (2 mm mesh size) for chemical and physical-chemical determination.

Carbon and nitrogen total content in litter and soil for all samples were determined by dry combustion (LECO CN 628) at the laboratory of the Instituto de Investigación Animal del Chaco Semiarido (INTA). The rest of the chemical parameters were determined for three points for each plot. Soil extractable P was determined using the Bray and Kurtz I method (IRAM/SAGyP 29570-1). Cation exchange capacity and Ca, Mg, Na, and K were extracted using the ammonium acetate pH 7 method. (IRAM/SAGyP 29577-1) Soil pH was measured in distilled water (1:2.5). These soil variables were measured at the laboratory of Edafology of Facultad de Agronomía y Zootecnia, Universidad Nacional de Tucumán.



Fig 2: Soil survey for chemical analysis.

QUALITY CONTROL INFORMATION

We performed the survey under the supervision of Dr. Natalia Banegas, who has extensive experience in soil sampling and analysis. In the laboratory, if necessary, all the determinations with values of parameters that were out of range were repeated. Also, all the variables were determined with a soil sample standard.

The laboratories used for the determinations are related to a Red de Laboratorios of the Institutions, and to the Sistema de Apoyo Metodológico a Laboratorios de Análisis de suelos, aguas, vegetales y enmiendas orgánicas (*Bioeconomía*, n.d.)

References

Bioeconomía. (n.d.). Retrieved April 12, 2024, from <https://www.magyp.gob.ar/sitio/areas/samla/>

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