

Root litter decomposition in a Sub-Sahelian agroforestry parkland dominated by Faidherbia albida

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► To cite this version:

Lorène Siegwart, Isabelle I. Bertrand, Olivier Roupsard, Maxime Duthoit, Christophe Jourdan. Root litter decomposition in a Sub-Sahelian agroforestry parkland dominated by Faidherbia albida. 5th World Congress on Agroforestry 2022, Jul 2022, Quebec City, Canada. hal-03715787

HAL Id: hal-03715787 https://hal.inrae.fr/hal-03715787

Submitted on 6 Jul2022

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The **objective** of this study was to measure the decomposition rate of root litters from annual and perennial species according to soil depth (down to 180) cm deep) and location (under and far from the trees) in a Sub-Sahelian agroforestry parkland dominated by *Faidherbia albida* in Senegal.

2 locations (under the tree and far (+30m) from the trunk)

x 4 soil layers (0-20, 20-40, 40-90, 90-180 cm)

x 3 plant species (Faidherbia albida, pearl millet and



Fig. 2 One of the pits

Soil characteristics were analysed. Fine root litter samples

were buried in litterbags (1mm mesh size) on October

15th, 2018 (d0) for 15 months (Fig. 2) and soil moisture

was monitored. Sampling of the litterbags occurred after

1.5 (d1), 3 (d2), 6 (d3), 9 (d4) and 15 months (d5) after

d0 (Fig. 3) and remaining dry mass was measured.

the buried litterbac





Methods

cowpea)

x 3 replicates

Results

x 5 sampling dates

Experimental set-up:



Fig. 3 Rainfall (a), soil water content

(b) and soil temperature (c) along time

20cm а -20 40cm mas Faidherbia (cm) 🛧 90cm

For all species and soil depths, root litter decomposition occurred mainly during the first 1.5 months (k1), when the soil is still wet from the previous wet season (Fig. 4).



Due to their chemical recalcitrance, Faidherbia root litters decomposed more slowly (36% remaining mass



plants exhibited lower rates of decomposition at depth than in the topsoil (Fig. 5), while the impact of depth on

tree root litter decomposition was lower (Fig. 4).

Acknowledgments

- Root litter decomposition occurs mostly in the first 1.5 months
- No difference of root litter decomposition between both locations (under and far from the tree)
- Tree root litters decompose more slowly compared to crop root litters
- Crop root litter amounts are greater in topsoils but decompose more slowly at depth



and litterbag sampling

Fig. 5 Remaining dry mass in the root litterbags at d2 (effect of soil depth for all species) and at d5 (effet of plant species at all depths)





Tree fine roots might contribute significantly to soil C stocks

5th World Congress on Agroforestry 2022. 17-20th of July, 2022. Québec City, Canada.



