

Leaf litter breakdown rate in some streams of the equatorial forest in Cameroon

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Introduction

The litterbags method with dead leaves of *Funtumia africana* (Benth) Stapf (Apocynaceae) was used in order to study the dead leaf decomposition process in some equatorial forest streams in Cameroon.



Picture 1. Litter bags ready for display (A), their installation (B) and removal (C) from streams

Methodology

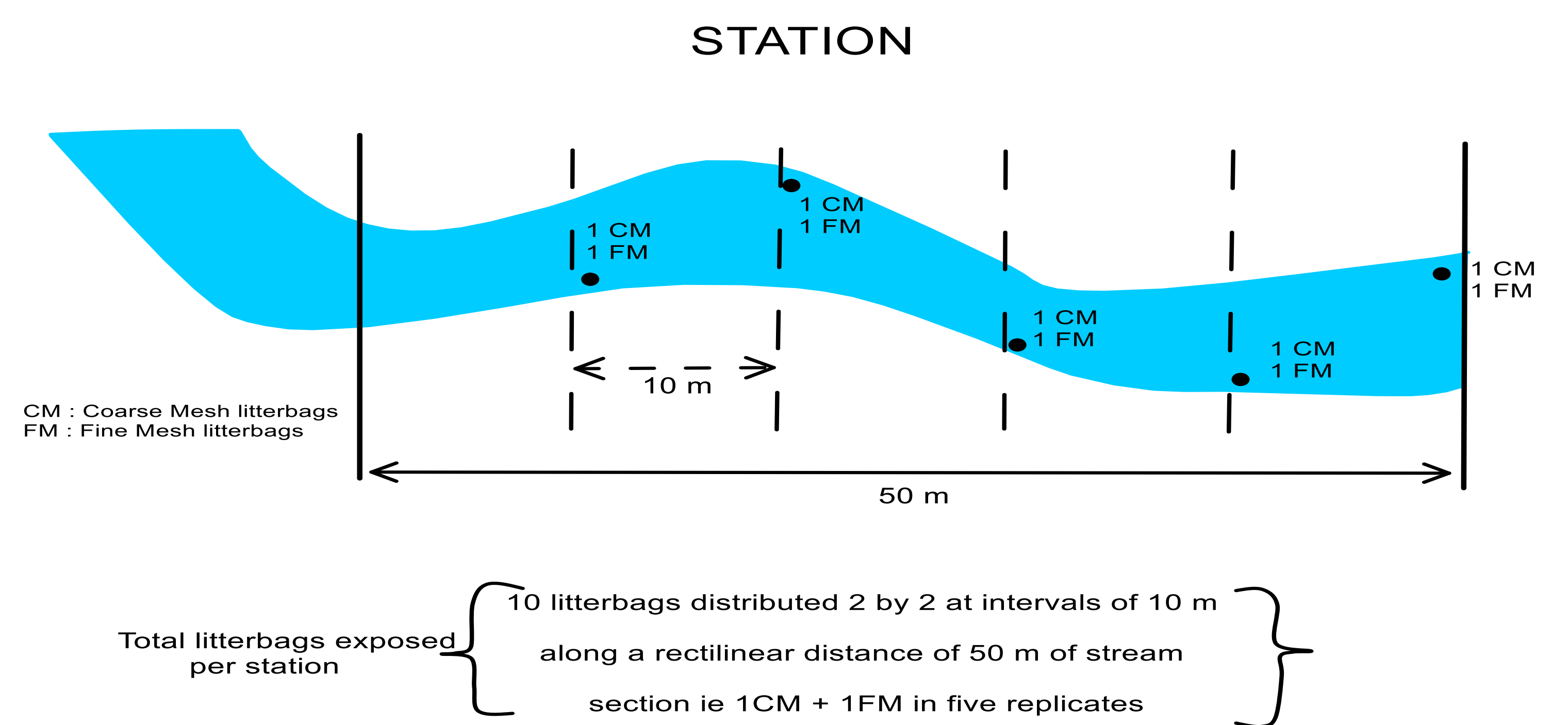


Figure 1. Experimental mapping for the installations of litter bags in streams

Results



Picture 2. Weighing the remaining litter at room temperature with Humeau Balance.

Highlights

- ✓ Acidic water limits the leaf litter decomposition rate;
- ✓ Distance from the source increases the leaf breakdown in streams;
- ✓ Shredder's contribution is very weak;
- ✓ Decomposition process is essentially microbial in streams;
- ✓ Seasonal effect and between-stream variability were low.

Results

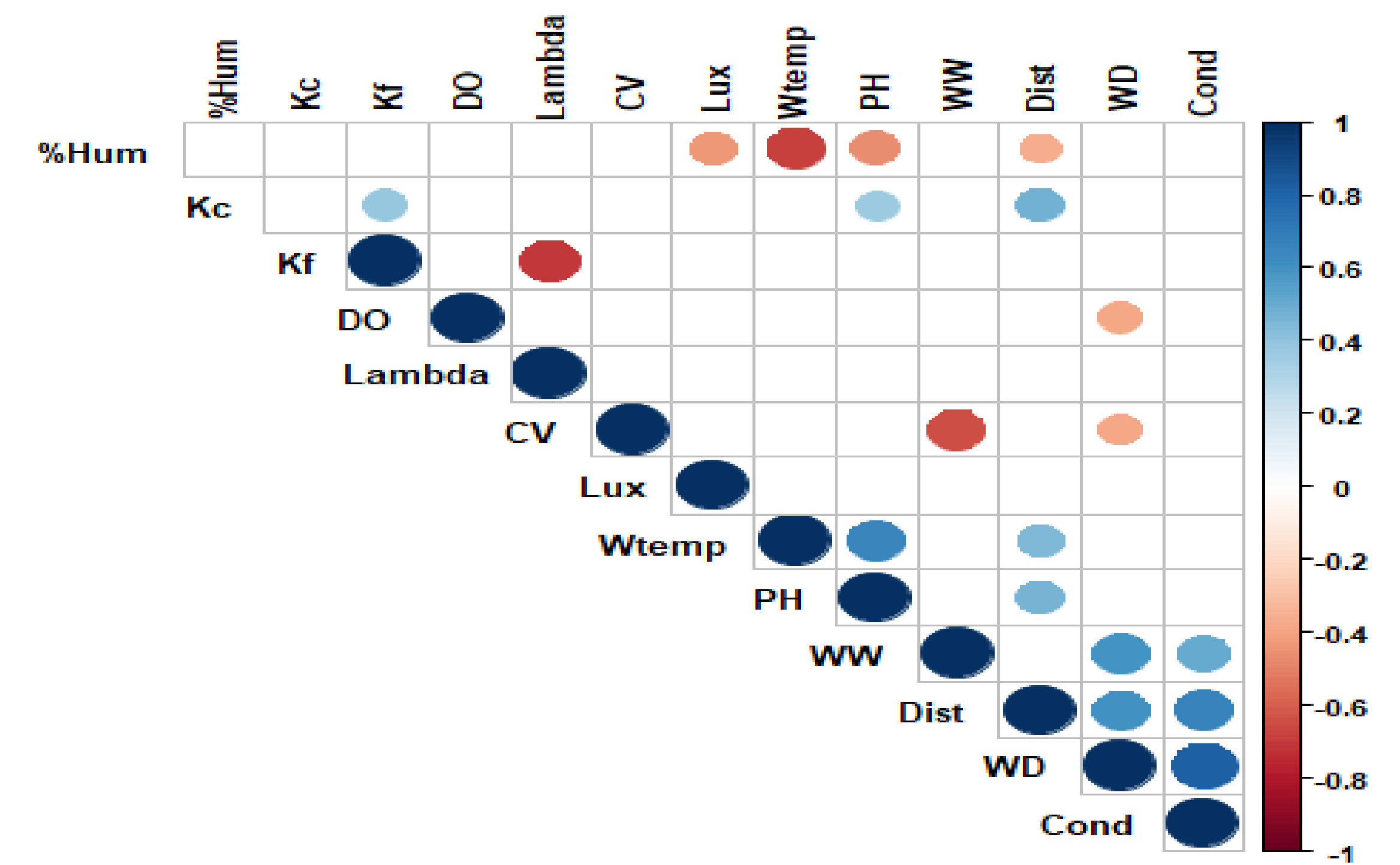


Figure 2. Pearson correlations between decomposition metrics (K_c , K_f , λ_c) and environmental factors. The values represent the correlation coefficients. The coloured squares represent the significant coefficients (red or blue, P -value < 0.05) according to the scale of the value indicated on the right of the correlogram.

The correlation matrix (Fig. 2) showed that only K_c was positively correlated with the distance to the source ($P = 0.0134$) and tended to be correlated with the pH ($P = 0.063$), whereas K_f was not correlated with environmental factors.

The table 1 shows that the leaf litter breakdown rate is much lower in Cameroonian and African streams than in temperate streams (Ferreira *et al.*, 2012; Kadeka *et al.*, 2021).

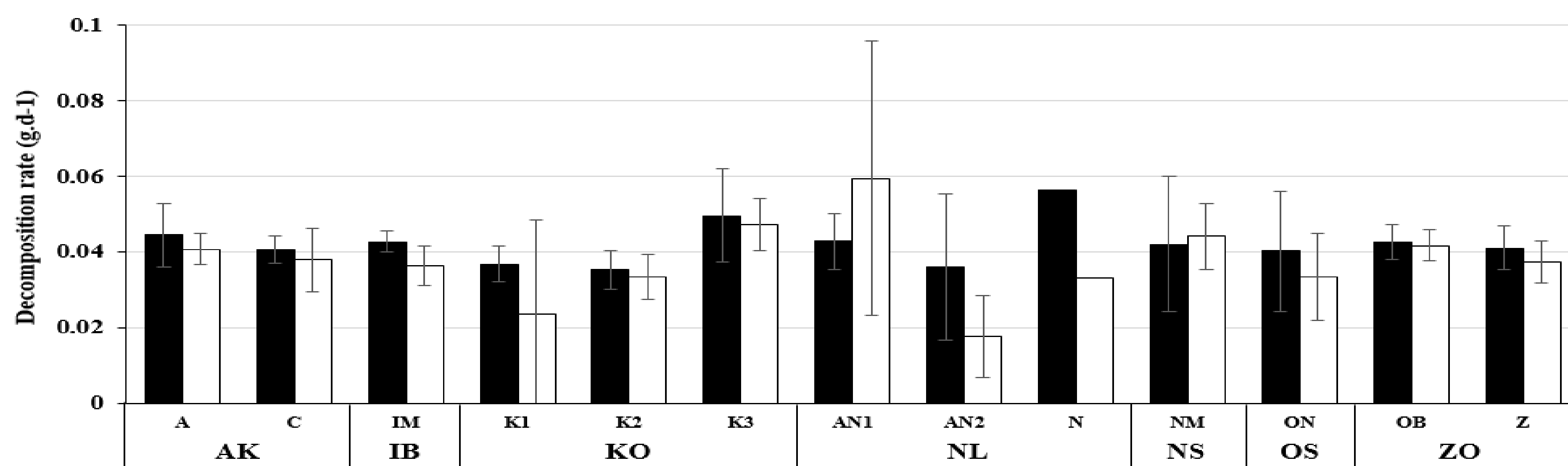


Figure 3. Mean values (\pm SD) of total decomposition K_c (black bars) and microbial decomposition K_f (open bars) in each site for the seven streams (AK: Akoumbegue; IB: Ibe-Mfeme; KO: Kongolo; NL: Nloumou; NS: Nsoe-Mekok; OS: Ossoe-Nkoro; ZO: Zoetoupsi). For site N, several bags destroyed, and the SD was not computed.

The figure 3 shows:

- In general, decomposition rates tend to be slightly lower at sites AN2 and K1 (Fig. 3).
- No statistical difference was observed between sites for total decomposition K_c ($F_{6,44}=1.63$; $P=0.162$)
- However, the microbial decomposition rate K_f varied slightly ($F_{6,44}=2.28$; $P=0.053$). It was higher in site AN1 than in most of the other sites (P -values < 0.05), except K3, N, NM, and ON.

Table 1. Total decomposition rate (K_c) and ratio of total decomposition rate to microbial decomposition rate (K_c/K_f) in some tropical and temperate forest streams.

Countries	Regions	Leaf species	Duratio n (days)	K_c (g.d) ⁻¹	K_c/K_f	References
Cameroon	Central Africa	<i>Funtumia africana</i>	15	0.035 – 0.056	1.21	Present study
Guinea	West Africa	<i>Albizia zygia</i>	48	0.001 – 0.051	1.51	Tenkiano & Chauvet, 2017
Guinea	West Africa	<i>Millettia zechiana</i>	48	0.062 – 0.080	1.42	Tenkiano & Chauvet, 2017
Kenya	East Africa	<i>Vernonia myriantha</i>	28	0.031 – 0.043	1.38	Kadeka et al., 2021
Kenya	East Africa	<i>Syzygium cordatum</i>	28	0.004 – 0.009	1.1	Kadeka et al., 2021
Kenya	East Africa	<i>Eucalyptus globulus</i>	28	0.006 – 0.01	1.36	Kadeka et al., 2021
Portugal	Europe	<i>Alnus glutinosa</i>	26	0.0411 – 0.0523	2.3	Ferreira et al., 2012

References

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