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Leaf litter morphological traits, body mass and phylogenetic affiliation explain the feeding and feces properties of saprophagous macroarthropods.

Pierre Ganault^{1,2}, Sandra Barantal^{1,3}, Sylvain Coq¹, Stephan Hättenschwiler¹, Shéhérazade Lucas¹, Thibaud Decaëns¹, and Johanne Nahmani¹

¹CEFE UMR 5175 CNRS, Functional Ecology, Montpellier, France (pierre.ganault@gmail.com)

²ECODIV, IRSTEA, Normandie Université, UNIROUEN, Rouen, France

³Montpellier European Ecotron, Univ Montpellier, CNRS, Campus Baillarguet, 34980, Montferrier-sur-Lez, France

Saprophagous macroarthropods are important actors in litter decomposition as they process large amounts of litter and transform it into fecal pellets that differ in chemical and physical properties compared to ingested litter. When having a choice among several litter types, saprophagous macroarthropods exhibit feeding preferences depending on their nutritional requirements and body size. However, how these preferences affect feces properties is not well known. We compared the feeding preferences, production of fecal pellets and their properties for six widespread saprophagous macroarthropods species feeding on a litter mix of four common tree species from Mediterranean forests. The six animal species showed different feeding preferences that were not correlated to litter nutritional quality. Instead, we suggest that the use as microhabitat of the leaves of one litter species with tubular shape by macroarthropods induced its higher consumption despite having the lowest nutritional value. Larger species consumed less litter per unit of body mass and had a more diverse diet composition. Furthermore, feces properties could not be linked to the diet composition, but always had higher nutritional value and water holding capacity compared to the leaf litter. The three woodlice species consistently produced feces with higher tannin concentration, higher specific area, and lower water holding capacity than that of the three millipede species. Our study calls for the consideration of other leaf litter properties than the generally studied physical and chemical ones, as well as quantifying the difference between millipede and woodlice faeces properties that may have functional implication for nutrient cycling.