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Home-field advantage and leaf litter decomposition across successional gradients

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Do football teams perform better when they play in their home stadium? And if so, which environmental conditions determine how much better they play at home than away? These questions puzzle the sports world, but also apply to processes in the soil, such as the breakdown of dead plants. When plants senesce, their dead remains drop on the ground year after year. As a result, the decomposer organisms in the soil that break down dead plant remnants may become specialized to decompose the material of the plant above them. In other words, these decomposer communities may perform better in their home environment than elsewhere. At the same time, as with football teams, some decomposer communities are just better at breaking down any plant material than other organisms. These differences in performance, as well as home-field advantage effects, may have large consequences for the recycling of nutrients in the soil. Yet, we have a very poor understanding of when these processes are important. In this study, we show that home-field advantage effects became generally stronger when the quality of the dead plant material was lower. This means that dead plant material that is hard to break down experiences more home-field advantage than material that is easy to break down. Although we also found that some decomposer communities were better at breaking down plant remnants than

others, we could not relate this to the quality of the plant material. Our finding that the magnitude of home-field advantage effects may vary with the quality of plant material shows environmental conditions have a key impact on recycling of nutrients in the soil. As a result changes in these environmental conditions may have crucial consequences for the strength of home-field effects and thereby for nutrient cycling.