Summary

* Plant-soil microbe interactions, or plant-soil feedbacks (PSFs), have profound impacts on plant community dynamics and have received increasing popularity over the past two decades.
* Most PSF experiments assume instantaneous and constant microbial effects throughout plant development without a time lag between soil conditioning and plant response.
* However, growing studies have begun to recognize the importance of time in plant-soil microbe interactions.
* Durations of soil conditioning and plant response as well as the timing of interactions at certain plant developmental stages can influence the outcomes of plant growth and biomass.
* Moreover, microbial effects can change after plant death.
* Besides biomass-based performance, microbial effects can have demographic consequences for plants, affecting seed germination rate and timing, seedling survival, and flowering phenology.
* By integrating temporal dimensions of plant-soil microbe interactions and the demographic effects into theoretical models and parameterizing these models with empirical results, we envisage a better prediction of long-term dynamics of plant-soil microbe interactions in natural contexts.