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**Droplet fragmentation on leaves shapes foliar disease dispersal** LYDIA BOUROUIBA, Massachusetts Institute of Technology, TRISTAN GILET , Liege University — Although the dispersal of pathogens from plant to plant remains poorly understood, a strong statistical correlation exists between rainfall patterns and plant disease outbreaks. This correlation suggests that rain is a culprit in the dispersal of foliar pathogens. In this combined experimental and theoretical study, we unveil the mechanisms at play when a raindrop impacts an infected plant leaf. We identify two main fragmentation processes that shape rain-induced dispersal mechanisms. In both, pathogens are initially contained in water residues left on leaves by previous raindrops. As most leaves are partially wetting, residues take the shape of sessile drops. The impact of another raindrop in the vicinity triggers fragmentation of the sessile drop and subsequent ejection of contaminated droplets towards neighboring plants. Each scenario yields a different distribution of ejected droplets and brings a distinct contribution to the epidemic onset pattern. We show that leaf mechanical properties govern both fragmentation scenarios. Dimensionless parameters and scaling laws are provided to rationalize our observations.

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