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Self-burial mechanics of hygroscopically active awns[1] WONJONG JUNG, Seoul National University, WONJUNG KIM, Sogang University, HO-YOUNG KIM, Seoul National University — We present the results of a combined experimental and theoretical investigation of the mechanics of self-burial of some plant seeds whose morphologies respond to humidity change of the surroundings. The seeds of Pelargonium species have hygroscopically active awns that play a critical role in the dispersal from the parent plant and burial in soil. While the awn uncoils to a linear shape in a highly humid condition, it recoils to a helical shape when dry. The rotation is driven by the structure of the cell walls that are comprised of cellulose microfibers aligned in a tilted helix. During uncoiling of the awn, the revolving tail generates thrust to burrow into soil, so that the seed is self-buried. We present the direct observation of the self-burial of the seed with the thrust into a soft substrate being measured at the same time. The elastica theory allows us to rationalize this botanical digging mechanics using the structural deformations of the hygroexpansive tissues.

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