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Functional Morphology and Seed Anatomy of the Invasive Weed, Benghal Dayflower (*Commelina Benghalensis*): Implications for Dispersal by Mourning Doves

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Benghal dayflower is an introduced noxious weed that infests and reduces yields in many agricultural crops. The weed has quickly spread throughout southeastern Georgia (USA) due to its tolerance to many commonly used herbicides, particularly glyphosate. The potential dispersal of this weed by migratory Mourning doves was investigated in this study. Evidence shows that doves feed on Benghal dayflower seeds with some birds containing hundreds of seeds in their guts (crop, proventriculus, and gizzard). Seeds extracted from harvested birds were examined for changes in their external morphology during digestion by scanning electron microscopy (SEM), and their viability by germination. Control seeds were used to ascertain seed tolerance to acid environments and for their normal structure. Benghal dayflower seeds showed reduced but high germination rates (45%) in seeds extracted from dove gizzards, and very high tolerance to a 2 h treatment in 1.0 M HCl for 2 h (82% germination) as compared to controls (92%). Benghal dayflower seeds germinate by rupturing through the micropyle region and lifting the embryotega, a callus-like covering over the micropyle. Even after imbibition, the seed coat does not rupture relating to its strength. The seed coat itself appears structurally reinforced with an intricate underlying cell layer with a complex of lateral cell walls that form a “honeycomb” pattern with little or no intercellular spaces. The outer “honeycomb” patterned layer is subtended by a continuous thick cell wall layer. The lumen of the outer layer of cells contains many inclusions whose chemistry has not yet been determined. The structure of these seeds is discussed with respect to their survival in bird intestinal tracts and with reference to dispersal and the potential establishment of new infestations of Benghal dayflower by doves and other birds.