Morphological Features of the Seed Coat Surface of Shiny and Opaque Black Bean Seed

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Seed coat luster is an important attribute that determines consumer acceptance of common black beans (*Phaseolus vulgaris* L.). This trait is controlled by a single dominant gene with shiny dominant to opaque. The gene has been designated Asper (Asp) by Lamprecht (1940). The morphological characteristics of the seed coat surface of shiny and opaque beans has not been well characterized. The objectives of this study were to confirm the inheritance of the shiny/opaque characteristic, evaluate seed coat surfaces of shiny and opaque beans using scanning electron microscopy (SEM), and compare water imbibition between F₄₅ isolines of shiny and opaque black bean lines. Genetic studies confirmed that seed coat luster was controlled by a single dominant gene with shiny (Asp) dominant to opaque. Micrographs obtained from SEM revealed that opaque lines had a thick epicuticular waxy layer on the seed coat surface, whereas shiny lines did not appear to have the waxy layer (Fig. 1). The presence of waxy epicuticular layers on the surface of dry bean seed coats was reported by Swanson et al. (1985). Water imbibition studies revealed that water uptake differed among six isolines, however mean water uptake between three opaque and three shiny lines did not differ. These results confirm that a single gene (Asp) controls seed coat luster with shiny dominant to opaque, and suggest that the opaque characteristic is due to the presence of a thick epicuticular waxy layer on the seed coat surface. Furthermore, the epicuticular layer does not appear to influence the rate of water imbibition.

![Figure 1. Scanning electron micrographs of shiny (A) and opaque (B) black bean seed coat surfaces (5000X).](image)

References:
