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Water Uptake by Seeds in Yellow-seeded Soybean (*Glycine max* (L.) Merrill) Cultivars with Contrasting Imbibition Behaviors

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Abstract: The rate of water uptake by seeds is assumed to be an important factor affecting the susceptibility of seeds to flooding injury, but the traits which could contribute to restricting rapid imbibition by seeds remain undetermined in yellow-seeded soybeans. This study was conducted to determine the possible factors controlling the rate of imbibition in soybeans with yellow seed coats. The imbibition behavior of two yellow-seeded cultivars, Tamahomare and Tachinagaha, with different flooding susceptibilities was examined in relation to initial seed moisture content, the hydration location of the seed surface during imbibition, and the state of the seed coat. Low seed moisture increased the water uptake by Tamahomare intact seeds and even allowed substantially faster imbibition than occurred in its embryos, while in Tachinagaha seed moisture content had little influence on seed imbibition. This rapid imbibition by low-moisture Tamahomare seeds was not due to alterations in the permeability of the seed coat nor in water uptake by the embryo, but rather to increased movement of water along the abaxial sides of the cotyledons. The seed coat of Tamahomare loosened readily upon submergence whilst that of Tachinagaha rather tightly adhered to the embryo, suggesting that the seed coat of Tamahomare adheres very loosely to the embryo and may aid in conducting water laterally between the seed coat and embryo. The degree of adherence of the coat to the embryo and/or the ease with which the coat can be loosened upon hydration appear to play a crucial role in determining the rate of water uptake in yellow-seeded soybeans.

Keywords: [Flooding injury](#), [Imbibition damage](#), [Seed coat](#), [Seed hydration](#), [Seed moisture content](#), [Soybean](#)

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