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[\[PDF \(1412K\)\]](#) [\[References\]](#)**NADPH Oxidases Act as Key Enzyme on Germination and Seedling Growth in Barley (*Hordeum vulgare* L.)**[Yushi Ishibashi^{1\)}](#), [Tomoya Tawaratsumida^{2\)}](#), [Shao-Hui Zheng^{1\)}](#), [Takashi Yuasa^{2\)}](#) and [Mari Iwaya-Inoue^{2\)}](#)

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Abstract: Reactive oxygen species (ROS) play an important role in seed germination. Although hydrogen peroxide (H₂O₂), a type of ROS, enhances the germination rate of various plant seeds, little is known about the mechanism. NADPH oxidases catalyze the production of superoxide anion (O₂⁻) that is one of the ROS and the enzymes regulate plant development. We, therefore, investigated the role of NADPH oxidases in seed germination and seedling growth in barley (*Hordeum vulgare* L.). The production of O₂⁻ was observed both in embryo and aleurone layers in barley seeds treated with distilled water (DW). However, it was suppressed in seeds treated with diphenylene iodonium (DPI) chloride, NADPH oxidase inhibitor. Moreover, DPI markedly delayed germination and remarkably suppressed α -amylase activity in barley seeds, indicating the importance of NADPH oxidases in germination of barley seeds. The gene expression and the enzyme activity of NADPH oxidases gradually increased after imbibition, and the enzyme activities were closely correlated with seedling growth after imbibition. Besides, DPI markedly suppressed the seedling growth. These results indicated that NADPH oxidases perform a crucial function in germination and seedling growth in barley. These facts clearly reveal that O₂⁻ produced by NADPH oxidases after imbibition regulates seed germination and seedling growth in barley.

Keywords: [Barley](#), [Germination](#), [NADPH oxidases](#), [Reactive oxygen species](#), [Seedling growth](#)

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