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Title	Reactive nitrogen species involved in the rapid root abscission, the stress tolerance mechanism, of the tropical fern <i>Azolla pinata</i>
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Citation	琉球大学21世紀COEプログラム「サンゴ礁島嶼系の生物多様性の総合解析」平成20年度成果発表会
Issue Date	2009-03-14
URL	http://hdl.handle.net/20.500.12000/9810
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PG-4 Reactive nitrogen species involved in the rapid root abscission, the stress tolerance mechanism, of the tropical fern *Azolla pinnata*

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Azolla pinnata is a tropical water fern when stressed exhibit an unusual and unique feature i.e. the rapid root abscission. Such feature of *Azolla* is thought to bring an advantage in survival under a variety of environmental stresses; however, the mechanism remains unknown. In plants, the free gaseous radical nitric oxide (NO), a well known signalling molecule, is produced under a wide array of stresses. It is associated with stress responses either by its direct involvement or through the production of its derivatives, reactive nitrogen species (RNS). We thus, hypothesized that NO/RNS is involved in the rapid root abscission of *Azolla*.

In order to investigate the role of NO in root abscission, *Azolla* fronds were subjected to various sources of NO. Nitrite (NO₂⁻), the only confirmed NO source in plants was found to be an efficient inducer of root abscission in *Azolla*. When the three major polyamines (PAs): putrescine (Put), spermidine (Spd) and spermine (Spm), which has been recently reported as NO source in plants, were used; only the latter two induced rapid root abscission with apparent time lag while Put failed to do so. However, hydrogen peroxide (H₂O₂), 1, 3-diaminopropane (Dap) and β-alanine (β-ala), the oxidation products of Spm and Spd were found ineffective in triggering root abscission. The chemical NO donor *S*-nitroso-*N*-acetylpencillamine (SNAP) alone also failed to induce root abscission but spermine-NONOate (SNN), the complex of Spm and NO, induced the fastest root abscission among all the NO sources used. These results suggest the involvement of RNS, other than NO, in the onset of root abscission and peroxynitrite (ONOO⁻) is the most likely RNS produced.