Cover Stories:

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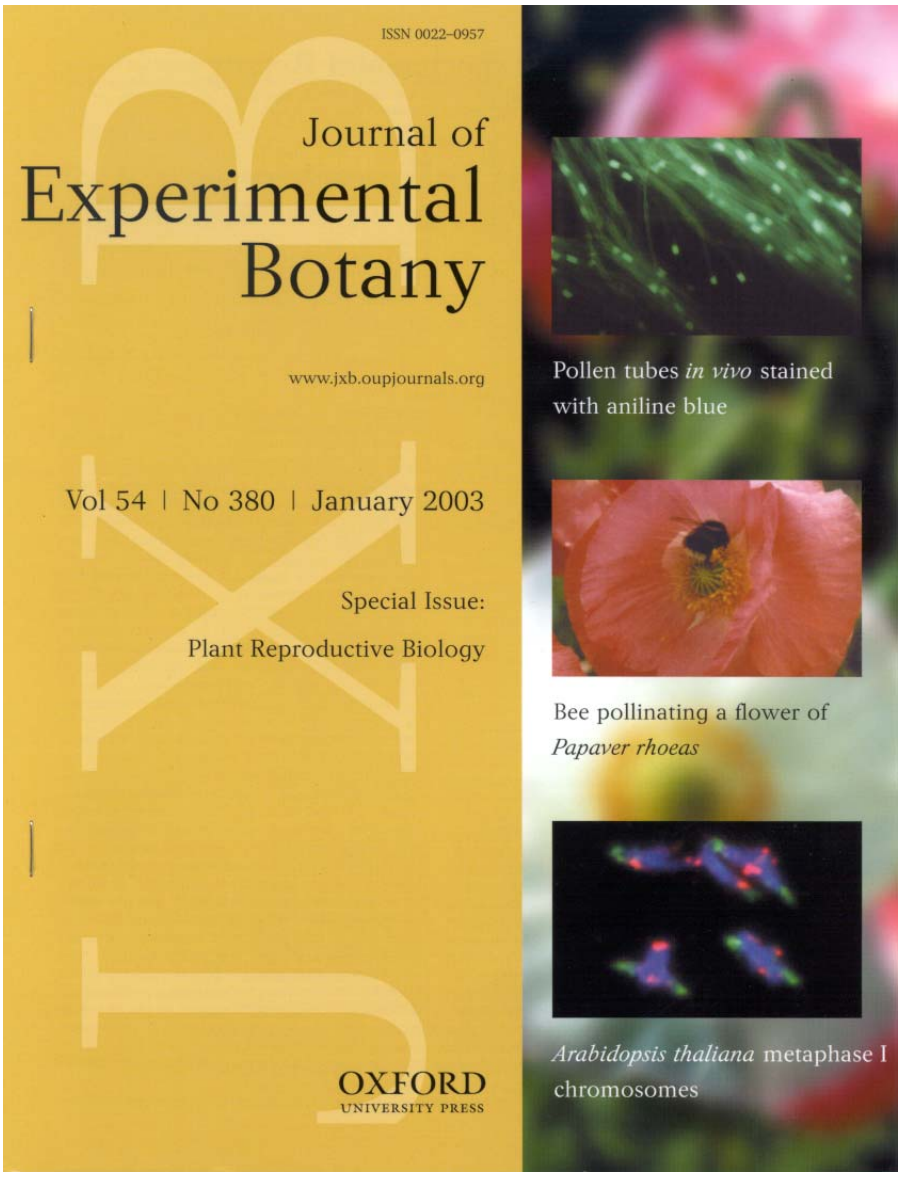
C. J. Staiger and V. E. Franklin-Tong. January 2003. The Actin Cytoskeleton is a Target of the Self-incompatibility Response in Papaver rhoeas. ***Journal of Experimeal Botany.*** *54(380): 103-113.*



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In plants, when pollen falls on the stigma (the female receptor in a flower), a pollen tube normally grows to the ovule, fertilizes it and eventually produces a seed. However, many plants have self-incompatibility systems which prevent self-pollination. This is advantageous for the species since inbred plants tend to be less vigorous. The authors of this article are interested in identifying components of the cytoskeleton, a dynamic network of polymers that drives the growth of the pollen tube through female tissue. In this study, the authors, in collaboration with the lab of Noni Franklin-Tong (Biosciences, University of Birmingham, UK), examined the structure of actin filaments, one of the components of the cytoskeleton. They found the self-incompatibility response triggers a massive and sustained destruction of actin filaments in the common field poppy. This appears to correlate with a large amount of calcium entering the cell. To model this response in the test tube, they examined profilin, which is a calcium-regulated actin sequestering protein. Careful biochemical analyses of poppy pollen profilin interactions with pollen actin demonstrate that this protein can cause the actin filaments to disassemble in a calcium-regulated fashion. However, the levels of profilin found in poppy pollen and its activation are not sufficient to explain the large changes in the actin effectors of the self-incompatibility response.

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