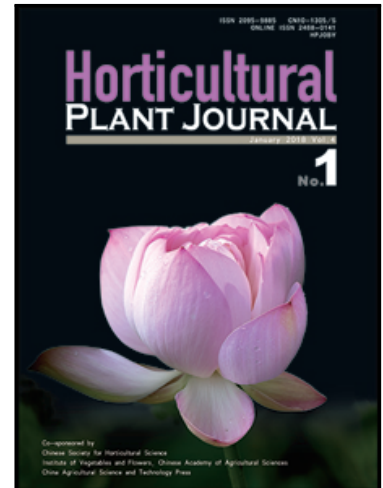


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Functional Characterization of the Promoter and Second Intron of *CUM1* During Flower Development in Cucumber (*Cucumis sativus* L.)

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Abstract

The characterization of flower specific promoter is critical during flower development by cucumber transformation technology. *AGAMOUS* (*AG*) is an organ identity gene that is required for carpel and stamen development in *Arabidopsis*. The promoter and second intron of *AG* contain multiple regulatory elements that confer proper spatial and temporal expression. Cucumber is an important vegetable with unisexual flowers. Cucumber MADS-box 1 (*CUM1*) is the *AG* homolog in cucumber, belonging to the euAG lineage along with *AG*. *In situ* hybridization showed that *CUM1* was specifically expressed in the stamens and carpels of cucumber. GUS staining indicated that the second intron of *CUM1* confers stamen-specific expression, while the promoter of *CUM1* drives both stamen- and carpel-specific expression during the early stages of flower development, but is restricted to carpel- and connectivum-specific expression during the late stages of flower development. Furthermore, a yeast one-hybrid assay demonstrated that two auxin response factors (*CsARF13* and *CsARF17*) had bound directly to the second intron of *CUM1*. Our data suggest that different regulatory circuits operate in *AG* homologs in plant species with distinct sex types.

Keywords: cucumber; *CUM1*; promoter; intron; *in situ* hybridization; GUS staining; yeast one-hybrid

1. Introduction

Plant MADS-box gene family members possess the DNA-binding MADS domain termed the CArG-box, that play important roles in many aspects of development, including male and female gametophyte development, embryo and seed development, and flower and fruit development (Schwarz-Sommer et al., 1990; Becker and Theissen, 2003). *AGAMOUS* (*AG*) is a C-type organ identity MADS-box gene that determines stamen and carpel development in *Arabidopsis*

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