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## Flowering and growth regulation in poplar (*Populus deltoides*)

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### Objectives

Classical tree breeding and genetic engineering require sexual reproduction for development of pedigreed offspring in cottonwood (*Populus deltoides*). However, most breeding efforts are only in the third and/or fourth generation of genetic selection due to the long duration of the juvenile phase by developing methods to stimulate precocious flowering is needed to accelerate tree improvement.

### Materials and Methods

#### 1. Material

Poplar: cottonwood (*Populus deltoides*).

#### 2. Methods

Identification and isolation of PdCO1 and PdCO2: Genomic DNA was isolated from unfolded leaves of the mature male tree using DNeasy Plant Maxi Kit

Analyses of mRNA expression patterns of PdCOs: Total RNA was isolated from the tissues using the procedure described by the manual and was denatured and separated by electrophoresis on a 1.2% formaldehyde agarose gel.

Analysis of morphological changes in axillary bud meristem: Buds were fixed in half-strength Karnovsky's fixative

(2% paraformaldehyde and 2.5% glutaraldehyde) with phosphate buffer (0.1 M, pH 7.2) for 48 h at 4°C.

### Results and Discussion

The increased expression coincided with morphological changes occurring in the axillary meristem of the subtended bud and with increased abundance of PdCO1 and PdCO2 proteins in the leaf. Although dormancy is under photoperiodic control in cottonwood, it is not known if photoperiod regulates flower induction and initiation. As cottonwood passes through a long juvenile phase before flowering, it may be insensitive to environmental stimuli that regulate floral induction until they have attained the appropriate developmental stage. Thus, a complex genetic network likely monitors both the developmental state of the cottonwood trees and environmental signals.

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