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Regulation of STM and CUC2 genes on apical meristem of cold-resistant winter Brassica rapa

Wancang Sun[1]
Yuhong Zhao[1,2]
Li Ma[1,2]
Yu Chang[1,2]
Jing Bai[1,2]
Yuanyuan Pu[1,2]
Zaoxia Niu[1,2]
Jiaojiao Jin[1,2]
Lijun Liu[2]
Junyan Wu[1,2]
Yan Fang[2]
Xuecai Li[1]

1 College of Agronomy, Gansu Agricultural University, Lanzhou, China

2 Gansu Provincial Key Laboratory of Arid land Crop Science, Lanzhou, China

To understand the molecular regulation of the SHOOT MERISTEMLESS (STM) and CUP-SHAPED COTYLEDON 2 (CUC2) genes on shoot apical meristem growth, both genes were cloned from winter Brassica rapa by RT-PCR. CDS sequence of STM gene was obtained to be of 1554 bp in length, encoding 517 amino acids, which was highly evolutionally conserved and belonged to PLN03226 superfamily. CUC2 open reading frame was 1104 bp long, encoding 367 amino acids, belonging to NAM superfamily. CUC2 was predicted to be a hydrophilic protein mainly composed of irregular curly and extended chains. Fluorescence quantitative analysis showed that under the same temperature, the relative expression of STM gene in winter B.rapa (cvs Longyou 6 and Longyou 7 with strong cold resistances, which had recessed growth cones) were lower than that with raised cone in Tianyou 4 and Lenox, but the relative expression of CUC2 gene was opposite. After 72 h of cold (0℃, 4℃ and -4℃), STM and CUC2 genes in the growth cone were up-regulated, indicating that both genes were involved in cold response in the growth cone to low temperature.

Keywords: Brassica rapa; Winter type; Recessed growth cone; Cold stress; Gene expression