M-117

Selection for a zinc-finger protein contributes to seed oil increase during soybean domestication

Jin-Song Zhang, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China

Seed oil is an important agronomical trait of soybean targeted by domestication in breeding. Although multiple oil-related genes have been uncovered, the knowledge of regulatory mechanism of seed oil biosynthesis is currently limited. Through analysis of transcriptomes in developing soybean seeds and identification of gene co-expression network, we demonstrate that seed-preferred gene *GmZF351*encoding tandem CCCH zinc finger protein is selected during domestication. Further analysis shows that *GmZF351* facilitates oil accumulation by directly activating *WRI1*, *BCCP2*, KASIII, *TAG1* and *OLEO2* in transgenic Arabidopsis seeds. Overexpression of *GmZF351* in transgenic soybean also activates lipid biosynthesis genes, thereby accelerating seed oil accumulation. *ZF351* haplotype from *Glycine max* group and *Glycine soja* subgroup III correlates well with high gene expression level, seed oil contents and promoter activity, suggesting that selection of *GmZF351* expression leads to increased seed oil content in cultivated soybean. This study provides novel insights into the regulatory mechanism for seed oil accumulation and manipulation of *GmZF351* may have great potential in improvement of oil production in soybean and other oil crops.