

Hands-on experience with PeanutBase - Solutions

Glyma.16g021000

1. Corresponding gene in peanut (Orthologous gene)

Hint: Use BLAT and genome browser

Aradu.FIU9K (DNA-binding protein)

Notice the soybean gene Glyma.16g021000 in the “*Glycine max* 2.0 gene models” track

2. Location (chromosome number, and start and end coordinates) of peanut gene

Hint: Use genome browser

Chromosome number: 02; Start: 4162397 bp; End: 4163427 bp

3. Identify molecular marker(s) flanking the peanut gene

Hint: Use genome browser

GM1160 and GM1852

4. Use the peanut gene and trace its gene family

Hint: Use “Gene Search” under “Browse and Search” tab

Gene family: phytozome_10.54695594

5. Use the gene family results, and report the Arabidopsis gene(s) in the same clade as of the peanut gene

AT3G61890 and AT2G46680

6. Click on Arabidopsis gene(s) in the same clade as of the peanut gene (links to ThaleMine), and report the Arabidopsis gene function and tissue(s) with maximum gene expression.

AT3G61890 - “Encodes a homeodomain leucine zipper class I (HD-Zip I) protein. Loss of function mutant has abnormally shaped leaves and stems.”

Highest expression: Leaf (senescent) and Flower (sep/pet/stam/carp)

AT2G46680 - “Encodes a putative transcription factor that contains a homeodomain closely linked to a leucine zipper motif. Transcript is detected in all tissues examined. Is transcriptionally regulated in an ABA-dependent manner and may act in a signal transduction pathway which mediates a drought response.”

Highest expression: Leaf (senescent) and Flower (sep/pet/stam/carp)

7. Annotate the peanut gene based on soybean and Arabidopsis gene functions.

The peanut gene “**Aradu.FIU9K**” is a Homeodomain Leucine Zipper Class I (HD-Zip I) transcription factor. The orthologs in soybean and Arabidopsis are involved in drought stress. This suggests the peanut gene may be a potential candidate for drought stress, and needs to be validated using wet-lab experiments.

Glyma.01g041700

1. Corresponding gene in peanut (Orthologous gene)

Hint: Use BLAT and genome browser

Aradu.SEJ3V (DNA-binding protein)

Notice the soybean gene Glyma.01g041700 in the “*Glycine max* 2.0 gene models” track

2. Location (chromosome number, and start and end coordinates) of peanut gene

Hint: Use genome browser

Chromosome number: 05; Start: 37872679 bp; End: 37875205 bp

3. Identify molecular marker(s) flanking the peanut gene

Hint: Use genome browser

PM36

4. Use the peanut gene and trace its gene family

Hint: Use “Gene Search” under “Browse and Search” tab

Gene family: phytozome_10.54695594

5. Use the gene family results, and report the Arabidopsis gene(s) in the same clade as of the peanut gene

No Arabidopsis ortholog found. Check for genes in other species in the gene family!!

6. Click on Arabidopsis gene(s) in the same clade as of the peanut gene (links to ThaleMine), and report the Arabidopsis gene function and tissue(s) with maximum gene expression.

No Arabidopsis ortholog found. Check for genes in other species in the gene family!!

7. Annotate the peanut gene based on soybean and Arabidopsis gene functions.

The peanut gene “**Aradu.SEJ3V**” is a transcription factor. It’s ortholog in soybean is involved in drought stress. No Arabidopsis ortholog was found. Hence, additional information from other species is required before performing wet-lab validation.