

Supplementary appendix 1. Sequences used in the present work.

***Arabidopsis* (Ubiquitin10) and *Vigna radiata* (actin) queries**

Arabidopsis thaliana polyubiquitin 10

NCBI Reference Sequence: NM_001084884.4

>gi|240255763|ref|NM_001084884.4| *Arabidopsis thaliana* polyubiquitin 10 mRNA, complete cds
TCACAATTCAGATTTCAATTTCTCAAAATCTTAAAAACTTTCTCTCAATTCTCTCTACCGTGA
TCAAGATGCAGATCTTTGTTAAGACTCTCACCGGAAAGACAATCACCCCTCGAGGTGGAAGC
TCCGACACCATCGACAACGTTAAGGCCAAGATCCAGGATAAGGAGGGCATTCCCTCCGGATC
AGCAGAGGCTTATTTTCGCCGGCAAGCAGCTAGAGGATGGCCGTACGTTGGCTGATTACAAT
ATCCAGAAGGAATCCACCCTCCACTTGGTCCTCAGGCTCCGTGGTGGTATGCAGATTTTCGTT
AAGACGTTGACTGGGAAAACATCACTTTGGAGGTGGAGAGTTCTGACACCATTGATAACGT
GAAAGCCAAGATCCAAGACAAAGAGGGTATTCCTCCGGACCAGCAGAGATTGATCTTCGCC
GGAAAACAACCTTGAAGATGGCAGAACTTTGGCCGACTACAACATTCAGAAGGAGTCCACAC
TCCACTTGGTCTTGCGTCTGCGTGGAGGTATGCAGATCTTCGTGAAGACTCTCACCGGAAAG
ACCATCACTTTGGAGGTGGAGAGTTCTGACACCATTGATAACGTGAAAGCCAAGATCCAGG
ACAAAGAGGGTATCCACCGGACCAGCAGAGATTGATCTTCGCCGGAAAGCAACTTGAAGA
TGGAAGAACTTTGGCTGACTACAACATTCAGAAGGAGTCCACACTTCACTTGGTCTTGCGTC
TGCGTGGAGGTATGCAGATCTTCGTGAAGACTCTCACCGGAAAGACTATCACTTTGGAGGTA
GAGAGCTCTGACACCATTGACAACGTGAAGGCCAAGATCCAGGATAAGGAAGGAATCCCTC
CGGACCAGCAGAGGTTGATCTTTGCCGGAAACAATTGGAGGATGGTCGTACTTTGGCGGAT
TACAACATCCAGAAGGAGTCGACCCTTCACTTGGTGTGCGTCTGCGTGGAGGTATGCAGAT
CTTCGTCAAGACTTTGACCGGAAAGACCATCACCTTGAAGTGGAAGCTCCGACACCATTG
ACAACGTCAAGGCCAAGATCCAGGACAAGGAAGGTATTCCTCCGGACCAGCAGCGTCTCAT
CTTCGTGGAAAGCAGCTTGAGGATGGACGTACTTTGGCCGACTACAACATCCAGAAGGAG
TCTACTCTTCACTTGGTCTGCGTCTTCGTGGTGGTTTCTAAATCTCGTCTCTGTTATGCTTAA
GAAGTTCAATGTTTCGTTTCATGTAAAACCTTTGG

Vigna radiata actin

NCBI Reference Sequence: XM_014655942.1

>XM_014655942.1 PREDICTED: *Vigna radiata* var. *radiata* actin-1-like (LOC106770112), mRNA
CCCGTTGTTTTCTCCGTAAAAGAATGAATAGTATTGGTGTAACGGAGAAAAGAATGAGCG
ATAAATGTAGCAGTAGCAGCGTGAATTTCTCTTTCTCTTCTCCAAATTTAAAATGGACAAA
AATTGGGAGGCATGATCCGACGGTCCCGATTGGGTTTGATGGTTGTTATATTCATTTGAATG
GAATTTGTTTCATTTTGTGTTTGTCACTGAGAATCGATTTTTTCATCCTCTCTTCTCCTCTCTCT
CCTCTCTCTCGCACTCGCATTTCCAAAGCAGAGCAGATATTAGAAGATGGCAGACGCTGAGG
ATATTC AACCCCTTGTTTGTGATAATGGAACGGGAATGGTTAAGGCGGGGTTTGCGGGAGAT
GATGCCCCACGTGCTGTCTTCCCTAGCATTGTTGGCCGTCTCGCCACACTGGTGTGATGGTT
GGCATGGGCCAGAAAGATGCGTATGTGGGTGACGAGGCTCAGTCTAAGCGAGGTATTCTCA
CTCTCAAGTACCCCATGAGCATGGTATCGTCAGCAACTGGGATGATATGGAAAAGATTTG
GCATCATACCTTCTACAATGAGCTTCGTGTGCGCCCGAGAGGAACATCCCGTTCTCTTGACCG
AGGCTCCTCTTAACCCTAAGGCTAATCGCGAGAAGATGACCCAAATCATGTTTGAGACTTTT
AATGCCCTTGCCATGTATGTAGCCATTCAAGGCTGTTCTTTCACTCTATGCCAGTGGTCGTACA
ACCGGTATTGTGTTGGATTCTGGGGATGGTGTCACTCACACAGTCCCTATCTACGAGGGTTA
TGCCCTTCTCATGCCATCCTTCGTCTTGATTGTTGGCTGGTGTGATCTCACTGATTTTCTGATG
AAGATTCTGACTGAACGTGGATATTCTTTTACCACCTCAGCGGAGCGCGAAATTGTGAGGGA
TATGAAGGAAAAGCTGGCTTACATAGCCCTGGACTATGAGCAGGAGCTTGAGACAGCCAAG
ACCAGCTCTGCAGTGGAGAAGAGCTATGAGTTGCCTGATGGGCAGGTTATCACCATTGGCGC
TGAGCGTTTCAGGTGTCCCGAGGTCTTGTACCAACCATCCATGGTAGGAATGGAAGCAGCAG
GCATTCACGAAACAACATACAACCTCCATTATGAAATGTGATGTTGACATCAGGAAAGATCTG
TACGGTAACATTGTACTTTCAGGAGGCACAACCATGTTCCCTGGCATTGCTGATAGAATGAG
CAAGGAAATTTCTGCTTTGGCCCCCAGCAGCATGAAGATCAAGGTGGTTGCACCTCCTGAGA
GAAAGTACAGTGTCTGGATCGGAGGTTCTATCCTGGCATCCCTGAGCACCTTCCAGCAGATG

TGGATTGCAAAGGCAGAGTACGATGAGTCTGGACCATCAATTGTGCATAGAAAGTGCTTCTA
AATTGTTTGATCAATAGGGTTATTGAAGGGAAAGACGGCTGTTTTATTCCTCCGGAAGAAGT
GCTGCCTGCTTGTAACCCCTTCATTCTATTCTAACTTTTTGTATCCGTTTACGTTATTCTCTGG
AGTGATGATTTGGAGAAGGCGAGGAGTTTATTTTGTCAAAAATGGTGCATGCAATTTTCACT
ATTATTATATATTCTATTCTATTCTTTGTTTAGATTCAATTGTGCGTCTGAATCAGCTGAAACTA
TCAAATGAACCACGCATTCTTGTTCTTGATATACAAAATTATGATTCCGATTTTCTGCATTA

Anchors sequences of CRGs primers pairs (fragments highlighted in red indicate the anchoring sites of the primer pairs)

1. CRG: *Vigna unguiculata* Actin

Database: NordEST

Sequence:

>Contig16004

GCGCTCTTTTCATCCTCTCTTCTCCTCTCTCTCCTCTCTCTCGCACTCGCATTTCCAAAGAGCA
GATATTAGAAGATGGCAGACGCTGAGGATATTCAACCCCTTGTTTGTGATAATGGAACAGGA
ATGGTTAAGGCGGGGTTTGCGGGAGATGATGCCCCACGTGCTGTCTTCCCTAGCATTGTTGG
CCGTCCACGGCACACCGGTGTGATGGTTGGCATGGGCCAGAAAGATGCGTATGTGGGTGAC
GAGGCTCAGTCCAAGCGTGGTATTCTGACTCTCAAGTACCCCATGAGCATGGCATCGTCAG
CAACTGGGATGATATGGAAGATTTGGCATCATACCTTCTATAACGAGCTTCGTGTGCCCC
CTGAGGAACATCCCGTTCTCTTGACCGAGGCTCCTCTTAACCCTAAGGCTAATCGCGAGAAG
ATGACCCAAATCATGTTTGAGACTTTTAATGCCCCTGCCATGTATGTAGCCATTCAGGCTGTT
CTTTCCTCTATGCCAGTGGTCGTACAACCGGTATTGTGTTGGATTCTGGGGATGGTGTGAGT
CACACAGTCCCTATCTACGAGGGTTATGCCCTTCCTCATGCGATCCTTCGTCTTGATTTGGCT
GGTCGTGATCTCACTGATTTTCTGATGAAGATTCTGACTGAGCGTGGATACTCTTTTACCACC
TCAGCAGAGCGTGAAATTGTGAGGGATATGAAGGAGAAGCTGGCATAACATAGCCCTGGACT
ATGAGCAGGAGCTAGAGACATCGAAGACCAGCTCTGCAGTGGAGAAGAGCTACGAGTTGCC
TGATGGGCAGGTTATCACCATTGGAGCTGAGCGTTT**CAGGTGTCCAGAGGTGTTGTACCAAC**
CATCCATGGTGGGGATGGAAGCAGCAGGCATTACGAAACAACATACAACCTCCATTATGAA
ATGTGATGTTGACATCAGGAAAGATCTGTACGGTAACATTG**TACTTTCAGGAGGCACAACCA**
TGTTCCCTGGCATTGCTGATAGAATGAGCAAGGAAATTTCTGCTTTGGCCCCCAGCAGCATG
AAGATCAAGGTGGTTGCTCCTCCTGAGAGAAAGTACAGTGTCTGGATCGGAGGTTCTATCCT
GGCATCCCTCAGCACCTTCCAGCAGATGTGGATTGCAAAGGCAGAGTACGATGAGTCTGGA
CCATCAATTGTGCATAGAAAGTGCTTCTAAATTGTTTGATCAATAGGGTTATTGAAGGAAAA
GACGGCTGTTTTATTCCTCCGGAACAACCTGCTGCCTGCTTGTAACCCTTTCATTCTATTCTAA
CTTTTTGTATCCGTTTACGTTTTTCTCTGGAGTCATTATGATTTGGAGAAGGCGAGGACTTT
GTTTTGTCAAAAATGGTGCATTCAATTTCCCTATTATTATATATTTCTATTTTTATTTTGAAT
TGAGATC

2. CRG: *Vigna unguiculata* polyubiquitin 10

Database: NordEST

Sequence:

>Contig282

```
AGTGGGGACAGTTCAATTCAAAAACAACTACTTCATTCTCTTTGCGCAGTTCCCTACCTCTCC
CCTCAAGATGCAGATCTTCGTTAAGACCCTTACCGGAAAGACCATCACTCTCGAGGTCGAGA
GCTCCGACACTATTGACAACGTGAAGGCCAAGATCCAGGATAAGGAAGGAATTCCCCCAGA
CCAGCAACGTCTCATCTTCGCTGGAAAGCAGTTGGAGGATGGACGCACCCTCGCCGACTACA
ACATCCAGAAGGAATCAACCCTTCACCTAGTTCTCCGCTCTCCGCGGTGGCATGCAGATCTTT
GTGAAGACTCTCACTGGCAAGACCATCACTCTTGAGGTGAGAGCTCCGACACAATTGACAA
CGTGAAGGCCAAGATCCAGGATAAGGAAGGAATTCCACCAGACCAGCAACGTCTCATCTTC
GCTGGAAAGCAGCTGGAGGATGGTCGCACCCTCGCCGACTACAACATCCAGAAGGAATCAA
CCCTTCACCTTAGTTCTCCGCCTCCGCGGTGGCATGCAGATCTTTGTTAAGACTCTCACCGGCA
AGACCATCACCTTGAGGTTGAGAGCTCTGACACCATCGACAACGTGAAGGCCAAGATCCA
GGACAAGGAGGGAATTCCCCCGGACCAGCAGAGGTTGATCTTCGCCGGAAAGCAGCTGGAG
GATGGAAGGACCCTGGCCGACTATAACATCCAGAAGGAGTCAACTCTCCACTTGGTGCTGCG
TCTTCGTGGTGGTATGCAGATCTTTGTGAAGACCCTCACTGGGAAGACTATTACCCTTGAGG
TGGAGAGTTCGGACACTATTGACAATGTGAAGGCCAAGATCCAGGACAAGGAGGGTATTCC
CCCGGACCAGCAGAGGTTGATCTTCGCTGGGAAGCAGCTTGAGGATGGGAGGACCCTTGCT
GACTATAACATTCAGAAGGAGTCTACCCTTCACCTTGTCTTCGTCTAAGGGGAGGAATGCA
GATTTTTCGTTAAGACTCTTACGGGCAAGACCATTACCCTTGAGGTGGAGAGCTCTGACACCA
TTGACAACGTGAAGGCCAAAATTCAAGGACAAGGAGGGCATCCCACCGGACCAGCAGAGGTT
GATCTTTGAGGGAAGCAGTTGGAGGATGGAAGGACCCTTGCTGATTACAACATTCAGAAG
GAGTCAACTCTTCACCTTGTCTTCCGCTCTTCGTGGGGGCTTTTAGACTGTGCTGATCTCTGTTT
TTAGTGCTTTCAAGACATTTTCAAATCGTAATGTGGATTGGGTCTTTATTGACCCTTTAAAT
AAATTTGGTTTGTGTTGGACTGCATTGTCCCTTTTTTATTATGAACTTTAGATATATACTATG
CTATTCTATGTTGCCTTATGTATTGATTTACGATTATTAATCAAGTTTAGATATATATATATAT
AATAACTAATTATGCTATT
```

3. CRG: Beta-tubulina

Database: RefSeq (NCBI)

Sequence:

>XM_007147394.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_006G126100g) mRNA, complete cds

TAGCATTACCCCCTCTCATTCAATTTCCATTTTCCTTCAAACCCAATCCCCAGTTTCCTCAAACCC
TAATTCCTTTTCTCCCACACTCTTGACACTCTCCGATCGAAAATGAGAGAAATCTTGACAT
CCAGGGAGGGCAATGCGGGAACAGATCGGAGCCAAGTTCTGGGAGGTGATCTGCGACGAG
CACGGCATCGACCACACCGGGAAGTACAGCGGCGATTCCGAGCTCCAACTCGAACGCATCA
ACGTCTACTATAATGAAGCCAGCGGCGGAAGGTACGTTCCACGCGCCGTCCTCATGGATCTT
GAACCCGGCACCATGGACTCCGTCAGATCCGGCCCCCTACGGCCAGATCTTCCGCCCCGACAA
TTTCGTCTTTGGCCAGTCCGGCGCCGGCAACAACCTGGGCCAAAGGCCACTACACTGAAGGTG
CCGAACCTCATCGACTCAGTCCTCGACGTCGTTTCGCAAAGAAGCCGAAAATTGCGATTGCTTG
CAAGGGTTTCAGGTGTGCCATTCTCTTGGGGGAGGAACGGGTTCTGGCATGGGGACGCTTCT
GATTTCAAAGATTTCGTGAGGAGTATCCAGATCGGATGATGTTGACGTTTTCACTGTTTCCTTC
TCCTAAGGTTTCTGACA**CCGTTGTGGAGCCTTACAAT**GCTACGCTCTCTGTTACACAGCTTGT
AGAGAACGCTGATGAGTGTATGGTTCTGGACAATGAGGCTCTCTACGACAT**TTGTTTCAGGA**
CCCTCAAGCTCGCTACACCGACGTTTGGTGACCTTAACCACCTGATTTCCGCCACCATGAGT
GGAGTTACTTGCTGTCTACGTTTCCCTGGGCAACTGAACTCCGATCTTCGCAAGCTTGCTGTT
AATCTTATCCCATTTCCCCGGCTCCATTTCTTTATGGTTGGGTTTTCGCGCCCTTGACATCTAGA
GGATCCCAGCAGTACCGTGCTTTGACTGTTCTGAATTAACACAACAAATGTGGGATGCTAA
GAACATGATGTGTGCTGCTGATCCTCGTCACGGTCGTTATTTGACTGCATCAGCAATGTTCCG
TGTAAGATGAGCACAAAGGAGGTAGATGAGCAAATGATCAATGTGCAAAACAAGAACTCT
TCATATTTTCGTTGAGTGGATACCTAATAATGTGAAGTCCAGCGTGTGTGATATCCCGCCTAA
GGGTCTTAAATGGCTTCTACTTTTCATTGGCAATTCTACTTCAATCCAGGAGATGTTTCAGGAG
AGTTAGTGAGCAGTTCACGGCTATGTTTCAGGCGCAAGGCTTTCTTGCATTGGTACACTGGGG
AAGGAATGGACGAAATGGAGTTCACTGAGGCTGAGAGTAACATGAATGATCTTGTTGCCGA
GTATCAGCAGTACCAGGATGCTACCGCCGATGAGGATGAGTACGAGGAGGAAGAAGAAGAT
GAGGAGGAAATTGCACCATAAGGCACTCCTTCATTTATAAAATGGTTTCAAATATCAATGTG
GTTGGCTTTGAACGAGTGGTGTAAGTTTTAATTGTGATGCAGTCAAATTAGATTGACTCGTTA
ATGTGTATGCTTATTATTGATTGTTGACATTGTATAAACTGGGTTTTGTTGACAATATTTCTGT
TCTTGAGAGATCAAGTCTTGGATGTTTGTAATAGTTAGTGACATGTTTTTTTCTCTTC

Annotation in Phytozome:

Transcript Name: Phvul.006G126100.1 (primary)

Description: PTHR11588:SF97 - TUBULIN BETA-4 CHAIN-RELATED

4. CRG: Elongation factor 1- α

Database: RefSeq (NCBI)

Sequence:

>XM_007151727.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_004G075100g) mRNA, complete cds

```
CGCACAGCAAGCGAAAGCAAAAAGGATCCAAATGGAAC TACTTAAAATAATAAGGGTATTT
TCGTCAACAGAGGAAAAAACTTGTAGCCTATAAATAAACCCTCTAACCTCGTTTCCTCACT
TCTCTTCACTCTATCATTCTCCTTTCTTCTCTTGCGGCTAGGGTTTTAGCGCAGCTTCTTCTAG
ATACTCAAACGCAGTTATGGGTAAGGAAAAGGTTACATCAGTATTGTGGTCATTGGTCATG
TCGACTCTGGGAAGTCCACCACCCTGGCCATCTGATCTACAAGCTTGGAGGCATTGACAAG
CGTGTGATTGAGAGGTTGAAAAAGGAAGCTGCTGAGATGAACAAGAGGTCATTCAAGTATG
CCTGGGTGCTTGACAAGCTCAAGGCTGAACGTGAAAGAGGAATTACAATTGATATTGCCTTG
TGGAAGTTTGAAACCACTAAGTACTACTGCACAGTCATTGATGCTCCCGGACACAGGGATTT
CATTAAGAATATGATTACCGGAACATCTCAAGCTGACTGTGCTGTTCTCATCATTGATTCTAC
CACTGGTGGTTTTGAAGCTGGTATTTCTAAGGATGGACAGACTCGTGAACATGCTCTTCTGTG
TTTCACTCTTGGTGTGAAGCAGATGATTTGTTGCTGTAACAAGATGGATGCTACTACACCCA
AGTACTCCAAGGCTAGGTATGATGAAATTGTGAAGGAAGTCTCTTCTACTTGAAGAAGGTG
GGATACAACCCTGACAAAATTCCTTTTCGTACCAATTTCTGGTTTTGAGGGAGACAACATGAT
TGAGAGGTCCACAAACCTCGACTGGTACAAGGGACCTACCTTGCTTGATGCACTTGACCAGA
TCTCTGAGCCCAAGAGGCCATCTGACAAGCCTCTCAGGCTTCCTCTCAGGATGTTTACAAG
ATTGGAGGAATTGGAAGTGTGCCTGTGGGACGTGTTGAGACTGGTGTGCATCAAGCCTGGTAT
GGTGGTGACTTTTGACCATCTGGACTGACAAGTGAAGTTAAGTCTGTGGAGATGCATCATG
AAGCTCTCACAGAGGCTCTCCCCGGTGACAACGTGGGGTTCAATGTGAAGAATGTTGCTGTT
AAGGATCTCAAGCGTGGTTATGTTGCTTCAAACCTCCAAGGATGATCCTGCCAAGGAGGCTGC
TAACCTCACCTCCCAGGTTATCATCATGAACCACCCTGGTCAGATTGGAAATGGCTATGCCC
CTGTTCTGGATTGCCACACCTCCACATTGCTGTCAAGTTTGCTGAAGTTATGACCAAGATTG
ACAGGCGATCTGGCAAAGAGCTCGAGAAGGAGCCTAAGTTCTTGAAGAATGGTGATGCTGG
ATTTGTTAAGATGATTCCAACCAAAACCCATGGTGGTGGAGACTTTCTCTGAGTATCCCCCTCT
TGGTCGTTTTGCTGTGAGGGACATGCGTCAAACCTGTTGCTGTGGGAGTCATCAAGAGCGTGG
AGAAGAAGGATCCCACTGGAGCCAAGGTTACCAAGGCCGCACAGAAGAAGAAGTGAATCG
TGCTGGGCGGTTCAACAGGGGATGGTTATAATAAATGCTGGTTTCTTGCTTGTACTCTTGTGT
CATCGCTAGGTAGATTGTTTTTCGTACTTAGTTTGAAGTTTCCGCCATCATCTCCGAAGTTT
GTTCCCAGAATTGGGTCTTGATCGACGGTGGCGGCTCTTTACTATTATTATGTCTTTTATG
TCTTTTTGTGTTTTGTGAGAACCCTGATTACATTTTTGTAAGCGCAGCAAGTTTACGGCTT
TGCTGCGTGGTTTGTGTTGCATTTTAAATATCGGACTTTTATATTTGTGTTTTAAATCGTGTTC
CTAATTATTTTCAGCATTTTAAATGTTATCTGTCAATTTCTGTCGTTTTAAATATTATCTGCCTT
GCATTAT
```

Annotation in Phytozome:

Transcript Name: Phvul.004G075100.1

Description: K03231 - elongation factor 1-alpha (EEF1A)

5. CRG: F-Box protein

Database: RefSeq (NCBI)

Sequence:

>XM_007131876.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_011G053400g) mRNA, complete cds

```
GAATAGTTTGTCTCTGTCAAATAATTTTGCTTTAAATGTTATAGTTATGAACAAATTTGGTT
GATTGTTGAGAGAGTGCAATTGAGAGAGCAGAAAAATGGGGTTGGAATCTGTTGGAGATTT
AGCCATTAACATGATTCTTAAGAAGTTAGAAGGCGAAGATGTTGCCAGAGTCGCTTGTGCCA
GCAAAAGGTTTAGGTTTTTCAGCTTCAGATGACACTCTTTGGACCAATCTCTGCTTCCATGAAC
TCGCTTTGACCCAACCCATCGATCATCTTGAAACCCCTTCCCTTCCTTCAAGGAATGCTATC
AAGCATGGAGAGGAGCTTTTGATATGTATCCATGGCCTCTTGTTAAGCGTGTGAAAAAGTGC
TGGGATAGAATAAAGACCTGGTTGACCAATAACTTTCCCTGAAGCTGAGGCCACTCTTTGTAA
AGGGGCAACTGAAGCTGACATTCAGACGTTGGAGAATTTGTTAAAGGTGGAATTGCCACTTC
CTACAAGGATCCTTTATCGCTTTTATAATGGGCAAGAAATCGTAAAAGCAAATCCAGAAACT
AGTACATTTGGAAGTTCTTTGGGTCTAATTGGGGGTTACTCCTTCTATAATCATTTGGTGAAT
GTTTATCTATTGCCTATACGTCAGATAATCCAAGAACTGAGCAAATTAGGCGTCACTTGAG
CTTTTTAAGAAGATCCAAGTTTGTTCTTGTGGCTGCTTCATCCACTTTCCGTAGAAAGTTGTT
TTTCCTCAACTGTTCCAATGGTCAACTATATGTTGGAACCAATAAACTTCATTCTGAAAAAG
ACATAATCCCTTGTGTACCTCAAGATCTGATAAGTTTACATCGGGAATTAAATATTGAAGAG
CAACAAGATGCCATGCTACTGTGGTTAGAAGAACATGGTCGTCGTTTAGAACATGGCTTCAT
CAAACCTCTGTGACAAAGAAAAATGGAAGAAGCATTAACTTTTCCCAGAAGAACCCCTTTTT
GTTCAACGGCTGTTACTAATGGTGTGAAGGTCCGTGCATCTGCATTGATTATCCCTGAGTTTA
TTGATCCTCAAGATGAGAATGAAAAGTACTTATTTGCTTATTCAATCCGCTTGTCCCTTGAAC
CGCAAGGATGCTTGATTAATGGAATGTCCTTCAACTCTTGTCAGCTCCATTGGAGGCACTGG
ATCATTTCGTGCTAATGATGATGTTGTATCGGATTTCAATGGAGAAGCTGTTATAGGACAGTA
TCCACTTCTGCATCCTGGTGAGAGAATTTGTTTATCAGAGTTGCACACCTCTACCACTGCC
ATCAGGTTCCATTGAAGGTTCTTTTACTTTTGTACCTGGCAGCTTGGCATAACCCAAAAGGAG
ACCCTTTTCTAGCTACAGTGGCACAATTCCTCTCCAGCTGCCAGACTATATTTTCTGATTTT
GATTCTGAATGGAATGAAGTATCTCTGATGGCAATTGCAGCTCCCCAATGGCGTTTGTGCA
CATTATGTGACTTTAGTGAGAGTGGCTTGGTTCCTGAGTTTTTATTCTTCTAAGTGTTGGACC
TGCACAATTTCCCTATATATAATCTATCTGTAGTAATATTGGATTCTTGCCTTATTCACCTGT
CTCTTAACCTTTGTACCCTCCATTCACCTCTGTATATATGCATGCGATTCAATGAGGTTTTTGTCA
TCTAATAGAATGGTAAAAG
```

Annotation in Phytozome:

Transcript Name: Phvul.011G053400.2

Description: PTHR14289:SF16 - F-BOX ONLY PROTEIN 3

6. **CRG:** Ubiquitin-conjugating enzyme E2 variant 1D

Database: RefSeq (NCBI)

Sequence:

>XM_007145751.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_007G270100g) mRNA, complete cds

AAAAATTGGGCCGAAACAGAACGGGCCCTTTTGGTCCATAGATTAGCAGTGAGGGACCAAT
AGTCATTATTCATTGCGAAAATCTTTCATCATTCTTTCTTTCTACAAAATCCCTCATTTCCTTC
TTTCTTCCCATTTCCACCTTTTCATCATCGTTCATCGCCTCCACCACGCACTCACCCAGATTC
TCCTTTCTCTCTGCCTTCTTCTCCCTCTCCAAATTTTGATTCTTTGATCAGATCCGCCACCC
CCACCTCCCCAAAACCTCTGCCACCCATCCATGACGCTTGGCTCAGGAGGATCCAGTGTCTG
TGGTTCCAAGGAACCTCAGATTGCTGGAGGAGCTTGAACGAGGAGAAAAAGGTATTGGAGA
CGGCACAGTTAGCTATGGAATGGATGATGGTGATGACATCTACATGCGATCTTGGACTGGCA
CCATTATTGGCCCCCATAATACTGTACATGAAGGAAGAATCTATCAACTGAAGCTGTTTTGT
GATAAAGACTACCCAGAAAAGCCCCAAGTGTTCCGGTTTCATTACGGATCAACATGACCTG
TGTTAATCATGAAAATGGAGTGGTTGAACCGAAGAAGTTTGGTCCTCTTGCAAATTGGCAAA
GAGAGTACTCCATGGAGGATATACTGACCCAAGCTGAAGAAGGAGATGGCAGCTCCTCATAA
CCGGAAGCTTGTGCAGCCCCCAGAAGGAACCTACTTTTAGCATTGAAGACGGTATAGATGTC
AGCTTGATTGCATATGCTGTATGCAATATATAGTGTGTAATGCTTTGTGGATCCTTCCTTCT
GAATTCAAGAACATATAGGGGAATGCCCCAAAAGATATTTCCATCTCCTTGCCTTCAAAGTT
GTTTTGTTGTCTTTCTCAACTGTGCTGAAGGGGGACTGTTTGATTAAAATATTGTGTGTA
TATTTCTAAAGCAACTATTTTAAGTAGTATTTTCCCTTTAATCCCAAAGGTGCTTTCAATTTA
GTCTTGCT

Annotation in Phytozome:

Transcript Name Phvul.007G270100.1

Description: PTHR24067:SF117 - UBIQUITIN-CONJUGATING ENZYME E2 VARIANT 1D

7. **CRG:** Unknown1

Database: RefSeq (NCBI)

Sequence:

>XM_007131494.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_011G023200g) mRNA, complete cds
GTGAAGAGCGAGGTGTGCATCGCAAATTCTAATTTTCTGATAAACTAATAATAATAACAAC
AAAACAGACACACCTGTGTAAGAAGGAGGTGAGTTACGTACGATTAGGTTTTCTTCTTCTCT
TTCTCTCTGATTTCGATCCATTTTCGATTGCTGAATTCATCCCATCGCAGAGCGTTTGAATTTGT
AGTTGAACAACGATGGTGGTGCCGCTGCTTAGTGTTTTTCATTCTTTTCGCTTTTATTCCAAAC
GGATTGTTAGCAGTTCCTTCAACCGTCCCCGCATTCCCTTTGGTCATCACATTATGAACTGGCC
TCTGAAACTGGATTGAAGGAATCTGTAAATTACCAAGTCATTTCTCCTTATGATCTTGCAAA
GTCTGTTATATCTGAAGCGGGCTGGTCAAATTTTCTGTGCAAAGGAAAGAAAACCTCACAAGC
CTCTGGATCTGGCACTTTTGTTCGTTGGTGGAGAGCTGCAATCTTCAGATTTAAGCATGAACA
AACATGCAGACCCAGCCCTTTTAGATCTGCTCAAGATCTCTTTTGCCAGATCCAACACTTCTA
TGGCTTTTCCCTATGTTTCTGCATCAGAGGATTTGCTTTTGGAAAACACTTTGGTTTCAGGAT
TTTCTGAAGCCTGTGGAGATGATACGGCAATTGCCAATGTTGCGTTCCATGGATCTTGCTCCA
TGGGTGGTACAAATGAAGAAGTCACAGCTTTGCATTCAAGACTATTTGACAAAGAG
GATGAAAGATAGTCACAGGGGGGAAAACAGATTTGGTTGTGTTCTGCAATGGAGGCTCTCAA
GATCTTAAAAATGTTGACAGGACACAATCTGAAGGGGAAAACCTTTATCGAAGCTTCTGAGTTC
CATGGAGGAATCGGGTGCAAAATATGCTGTTCTTTATGTGTCAGATCCCTCCAGGTCAATCC
GGTATCCTTCTTACAGAGAAGTGCAGAAAGTTTCTTGAAGAAGGTGCTGAATCAACCAATTCC
ACAGGTTGTGATAAAGTCTGCATGCTTAAATCATCTCTTTTGGAGGGAATTTTGTGGGTTTA
GTTTTGCTAATCATTTTGGATATCGGGCCTTTGCTGCATGATGGGAATTGACACCCCAACAAG
ATTTGAGACGCCACAAGAGTAATGATCCGTTTCTCGAAGCTAAAATTTGTTGTGATGCTCGG
TCTAATGATTAATAATATTGCTGTCGTATTATTTGCGATTCTTCCGGAGGCTCTGATAAGTATT
CTGTAGTTGATGACTTATCTCAGGGACTTTTAATATTGAATATTAATAAATTTGTATCAGTA
TATAAAAATAAACTTCAATGTTAGGTTTATTTTGGATCCCGCTACCACTAGTGTAATAATTTG
AAGAAATTTTCAGATTGTGATGTATTATTGTTATTACTGTCTGCAATTTGATCCATTCGTTTT
GCATAACTGCTGATCGATGCAGTTCCAAGT

Annotation in Phytozome:

Transcript Name: Phvul.011G023200.1

Description: FAMILY NOT NAMED

8. CRG: Zinc-metalloproteinase, peroxisomal-like

Database: RefSeq (NCBI)

Sequence

>XM_007162147.1 *Phaseolus vulgaris* hypothetical protein (PHAVU_001G1332000g) mRNA, partial cds

```
CAAATAGACTGAACCCATTACCAGTACAAAAACACGAGTATCGCAATGGACTCTGTTCTGTA
GCTAACACTCCACAGTCCACAAAATAGCGAAATAAGAGTTAGGAAAAGTAGAACAGAACAA
AACAAAACAGAGTCGTCGTCGTCCTTTCTTACTTTTACTCGTCACCGCGAAATATCAATCTTC
TGCAGCACTCATCTCAATTCGAGTTTCAAGCGCAAGGAACAGAACAGAACACGCAATCATT
ACCTTCCAACGCCACCAAGCCAGAACAAAGACGAGTTAGGGTTGTAATCAGAGCGAGGGAG
AAGATGGCAATTAAGGACGACGTGGAAATTGTGAAGGCTCGCATCGACAAGAGGGATTACA
GAAGAGTCGTGCTTCGCAACTCGCTCCAAGTGCTCCTCATTAGCGATCCCGTTACCGATAAG
TGTGCTGCTTCCATGAACGTTGGCGTCGGTTACTTCAGTGATCCTGCTGGCCTCGAAGGCCTC
GCCATTTTCTCGAGCACATGCTGTTTTATGCGAGTGAAAAATACCCAGTTGAAGATAGCTA
CTCCAAGTATATTACTGAGCATGGAGGAAGCACCAATGCTTTTACAAGTTCTGAACAAACCA
ACTATCATTTTGAAGTTAACACAGACGGCTTTGAAGAGGCTCTGGACAGATTTGCTCAGTTC
TTCCTAAACCATTGATGTCTCCTGATGCCACCATGAGGGAAATTAAAGCTGTTGACTCTGA
AAACCAGAAGAATTTACTATCTGATGGATGGAGAATTAACCAGCTTCAGAAGCATCTGAGT
GACGAAGATCATCCATATCATAAGTTTAGCACAGGGAATTGGGACACTTTGGAAGTTAAGCC
TAAAGCAAAAGGATTAGACACAAGGAAGGAGCTTCTCAAGTTTTATGATGAAAACTATTCT
GCCAATTTAATGCATCTAGTTATATACACAAATGAAACCCTTGATAAAATTCAAAACCTTGT
AGAAGAAAAGTTCCAGGATATTAGAAACACCAGCAAAAGTTGTTTCCATCCTTGTGGTCAGC
CATGCAAAATCAGAGCATTTGCAGATTCTTGTCAAAACTGTCCCAATAAAGCAAGGTCACAAA
TTGAGAATTGTATGGCCAGTAACCCCTGAAATTCATCATTACACTGAAGGGCCAAGCAGGTA
TCTTGGCCATCTCATTGGTCATGAAGGAGAAGGGTCTTTATATTACATCTTGAAAAAATTGG
GGTGGGCTACGGGCTTGTCTGCCGGCGAATCAGATTGGAGCTTGGAGTTTGCTTTCTTTACA
GTTGTAATTGATCTTACTGATTCTGGTCATGAGCACATAGAAGATATCATTGGGTGTTGTTTC
AAATACATTGAGCTTCTACAGCAGTCTGGTGTGTTGCGAATGGATTTTGAAGAGCTTTCTGCA
GTTTGTGAGACCAAGTTTCATTATCAGGACAAAATTCCTCCCGGTGATTATGTTGTTGATATT
GCATCAAATATGCAGTTTTATCCTGTGAAAGATTGGCTGACAGGATCATCCTTGCCCTTTAAG
TTTAGCCCAAATGTTATCCATATGGTACTAAATCAGCTTTCTCCGGACAATGTTTCGAATTTT
TGGAATCTAAAAATTTGAAGGGCTTACTGATAAGGTGGAGCCATGGTATGGAACCTGCGTA
TTCCCTTGAAAAGATTACTGGCTCTGCTATTACGGGTGGATGGCTTCTTCTGCTGATGAAAA
TATGCATCTTCCAGCTCCTAACAAATTCATTCCAACGGAATGTCACCTTAAACTGTGCAAG
AAACGGTGAAGTTTCCAGTTTTGTTAAGCAGGTCAACTTATTACGCTTATGGTACAAGCCA
GACACATTGTTTGCTACACCCAAGGCTTATGTTAAGATTGATTTCAATTGCCCATATGCTGGA
AGCTCTCCTGAGGCTCAGATTTTGGTGAATATTTTACACAATTATTGATGGATTACTTGAAT
GACTATGCTTATTACGCTCAGGTTGCTGGTCTATACTATGGCATAAATCGCACAGATGGTGG
TTTCGAGGTGACACTCTTTGGTTATAATCACAAGTTAAGGATTCTGCTTGAAACTATAGTTGA
AAAGATTGCAGCATTTGAAGTGAAACTGACAGGTTTTTCAGTCATCAAGGAAATGGTAACC
AAGAAATATCAGAATATGAAATACCAACAACCTTATCAGCAGGCTATGTACTATTGCTCTTT
GATCTTACAAGATCATACCTGGCCTTGGACAGAACAACCTCGACATACTTCCTGCTCTTCAAG
TTGAAGATATTGCTAAATTTGTACCATTAATGCTCTCGAGGACATTTTACTGCTTCTATATAG
CAGGGAACATTGAAAGCCATGAAGCAGAGTCGATAGTCAAGCACATTGATGATGCTCTCTTT
AATTGTTCAAAACCTGTGTGTAAGCCTTTATTCTCATCTCAACATTTGGCCAACCGAGTTGTT
AAACTGAACGTGGCATGAGTTACTTCTACCTTCAGAATGTCTTAATCCTGAAAATGAGAA
TTCTGCTCTTCTGCACTACATACAGGTTGGTTCGTGATGACTTTAAGCTTAATGTTAACTTCA
GCTTTTTGCTCTTGTGCAAAGCAACCAACCTTTCATCAGCTTACGATCTGTTGAGCAGCTGGG
GTACATTACTGTGCTCTTGCAGAGGAATGATTGTGGTATACGTGGACTACAGTTTATTATCCA
ATCCACAGTAAAGTCTCCCGGGAACATTGAACCAAAGGGTTGAGGCATTTCTCAAAAATGTTTG
AGACCAAGCTTTATGAGATGACAATTGATGAATTCAAG
```

Annotation in Phytozome:

Transcript Name: Phvul.001G133200.1

Description: METALLOPROTEASE

9. CRG: Glyceraldehyde-3-phosphate dehydrogenase C-subunit (GAPC)

Database: RefSeq (NCBI)

Sequence

>XM_003526927.3 PREDICTED: *Glycine max* glyceraldehyde-3-phosphate dehydrogenase, cytosolic (LOC100783902), mRNA

AGAAATCGCAAAAAAGGGTATAGCGTAATCCATGGCACAGTATCACAGGTCATACGCCGGT
CATGTAGGTGTCACCCACCCGACCCACCTACTTCACCTTACCTTTACGTGCCATTTTGCTCTTTT
TTACCCCTTCTTTCAACCCTTTATTAAAACCCCTATCTCGCTCGCACTCACCCACACACCATCCG
TTCTAGTCTCAACTTCTGCTCTTCCAACCTCTACAACGCTTTTCTCTGCACTCATGGGCAAGG
TCAAGATCGGAATCAACGGATTTGGAAGAATTGGCCGTTTGGTTGCCAGAGTCGCTCTGCAA
AGAGACGATGTTGAACTCGTTGCCGTTAACGACCCTTTCATTACCACCGATTACATGACATA
CATGTTTAAATACGACAGTGTTACGGACACTGGAAGCATCACGATGTCACCGTTAAGGACG
AGAAGACCCTTCTCTTCGGTGACAAGGCAGTCACTGTTTTTGGACACAGAAACCCTGAAGAG
ATCCCATGGGGGTCAACTGGAGCTGACATCATTGTTGAGTCCACCGGAGTTTTACCGGATAA
GGACAAGGCTGCCGCACATTTGAAGGGTGGTGCCAAGAAGGTTATTATTTCTGCCCCAGTA
AGGATGCCCCCATGTTTGTGTTGGTGTTAATGAGCACGAGTACAAGCCAGAGCTTGATATT
ATTTCCAACGCTAGCTGCACAACCAACTGCCTTGCTCCACTCGCCAAGGTTATCAATGACAG
GTTTGGCATTGTTGAGGGTTTGATGACCACTGTTCAATCCATCACTGCTACCCAGAAGACTGT
TGATGGGCCATCAGCCAAGGACTGGAGAGGTGAAGAGCTGCTTCATTTAACATCATTCCTA
GCAGCACTGGAGCTGCCAAGGCTGTTGGGAAAGTCCTTCCTGCTTTGAATGGAAAATTGACT
GGTATGGCATTCCGTGTTCCCACCGTGGATGTCTCTGTTGTTGACCTCACGGTGAGGCTGGA
GAAGGAAGCCTCATATGATGAAATTAATAATGCTATCAAGGAGGAATCAGAGGGCAAGTTG
AAGGGAATTCTTGTTTACACTGAAGATGATGTGGTCTCCACCGACTTTGTTGGTGATAACAG
ATCAAGTATTTTTGATGCAAAGGCTGGAATTGCATTGAATAAGAATTTTGTGAAGCTTGCT
CTTGGTATGACAACGAGTGGGGATACAGTTCACGTGTCATTGACCTGCTTGTAATCGTTGCC
AAGAAGTCTTTTTAATTAAGGTGGTTCTAACATTATGTGCTGGTCAAGCTGCGATTTAGTGTC
TTGCTCGTGCAAAAATTGAGAAGTATGAATAAATCGGTTTCCGGAACCAGTGTTGTTACCCT
GTTACGAGCATTAAAGCTCTTTTTTGTTCCTCTTCTGTGTAGGGGATGGAGTTTTTGGATTCT
TATATACTTGCAGATGTACTCGGGCTTTATTGATTCTGATAGCAGACATTTTCCCTCCATTTT
CATCCATGGTTCTCGAGTGTTTGAACCCCCCTTCCTTTTCTGCTTTGAATTAAGATTTCGTGTT
TTATATA

Annotation in Phytozome:

Transcript Name: Glyma.06G172600.1

Description: PTHR10836//PTHR10836:SF44 - GLYCERALDEHYDE 3-PHOSPHATE DEHYDROGENASE