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| Gene\_ID | Omega | Pop\_RAiSD | RefSeq\_Entry | UniProtKB | UniProtKB/Manual Annotation | Main function (bold if the function has been found in insect) |
| Nriv.00g169830 | 32.0564 | 14 | XP\_974022.1 | D6WST0 | Trifunctional nucleotide phosphoesterase protein YfkN-like Protein | respond to phosphate shortage (Bacillus spp.) |
| Nriv.00g068430 | 54.4507 | 13 | XP\_023718359.1 | A0A2J7Q1Z5 | tectonin beta-propeller repeat-containing protein isoform X2 | **autophagy** (Drosophila) |
| Nriv.00g139430 | 34.2244 | 12 | XP\_023312721.1 | NA | programmed cell death 6-interacting protein-like, partial | endocytosis, multivesicular body biogenesis, membrane repair, cytokinesis, apoptosis, maintenance of tight junction integrity (Homo sapiens) |
| Nriv.00g057760 | 23.1684 | 12 | XP\_018578886.1 | NA | cytoplasmic FMR1-interacting protein | translation repression (Homo sapiens) |
| Nriv.00g169800 | 27.1861 | 11 | XP\_018900115.1 | NA | PREDICTED: sodium-independent sulfate anion transporter-like isoform X1 | **Sodium-independent sulfate anion transporter activity**. The over expression of this genes was found in larva and in the midgut of Diamondback moth, which could be associated with defecating the toxic sulfates from sulfur-containing defense compounds in host plants (Rausch & Wachter, 2005; You et al., 2013). Similarly, the genes is up-regulated in *Myzus persicae* responding to trans-anethole, suggesting the important function in detoxification. This gene is also found in pupa of *Chilo suppressalis*, which could be associated with pupal development including stiffness and pigmentation (Sun et al., 2017). |
| Nriv.00g031290 | 23.2683 | 11 | NA | NA | NA |  |
| Nriv.00g142910 | 53.7347 | 10 | XP\_023705556.1 | NA | prolow-density lipoprotein receptor-related protein 1 isoform X2 | Endocytosis and phagocytosis of apoptotic cells; or cellular lipid homeostasis. In *Litopenaeus vannamei*, it is found to be responding to low salinity stress (Q. Zhao, Pan, Ren, & Hu, 2015), and in *Apis mellifera*, it could be involved in chalkbrood disease resistance (Holloway, Sylvester, Bourgeois, & Rinderer, 2012). |
| Nriv.00g080120 | 36.7588 | 10 | XP\_013186855.1 | NA | PREDICTED: NFX1-type zinc finger-containing protein 1-like | The function of this gene in insects is not well known. The main function of this gene in general is to regulate the gene expression. |
| Nriv.00g071820 | 24.8468 | 10 | XP\_018580177.1 | NA | insulin-degrading enzyme | The main function of insulin-degrading enzyme (IDE) involves insulin catabolic process which could affect the trehalose metabolism. The trehalose is a very important energy source and could help insects against different environmental stresses (Chen, Behar, Xu, Fan, & Haddad, 2003; Chen & Haddad, 2004; Shukla, Thorat, Nath, & Gaikwad, 2015). The regulation of carbohydrate metabolism is also crucial for insect in adaptation to alpine regions with hypoxia environment (Ding et al., 2018; D. Zhao, Zhang, Cease, Harrison, & Kang, 2013). |
| Nriv.00g171540 | 22.5569 | 10 | NA | NA | NA |  |
| Nriv.00g012860 | 95.9947 | 9 | XP\_969795.2 | D6WY20 | Forkhead box protein K1-like Protein | FoxK has many functions and one of the most important functions is to regulate the glucose metabolic process. In human, this gene can regulate and act with Hif1α to regulate the glucose metabolism (He et al., 2018). In *Drosophila*, FoxK has been found to active against pathogeny virus (Panda et al., 2015). |
| Nriv.00g046230 | 54.7342 | 9 | XP\_023013584.1 | NA | polypyrimidine tract-binding protein 1 | This gene functions mainly in mRNA splicing, metabolism, and gene expression regulation (Valcárcel & Gebauer, 1997). In *Drosophila*, PTB is also involved in embryo development including male germline and dorso-ventral patterning (Davis, Sun, & Standiford, 2002; Heimiller, Sridharan, Huntley, Wesley, & Singh, 2014; M. Robida, Sridharan, Morgan, Rao, & Singh, 2010; M. D. Robida & Singh, 2003). |
| Nriv.00g061930 | 35.0345 | 9 | XP\_025832420.1 | A0A7F5R8X9 | beta-1,4-glucuronyltransferase 1 | This gene is involved in O-mannosylation, a process remaining largely unknown in insects but has been found to be associated with beetle wing formation (Li, De Schutter, Van Damme, & Smagghe, 2021). |
| Nriv.00g092020 | 26.3339 | 9 | XP\_018563541.1 | NA | putative 1-phosphatidylinositol 3-phosphate 5-kinase | This gene is found mostly in plant, with main function of regulating endomembrane homeostasis. |
| Nriv.00g057860 | 128.343 | 6 | XP\_015510662.1 | A0A6J0B8Y9 | Deubiquitinating enzyme A | The Deubiquitinating enzyme family has been found to be associated with eye development in Drosophila (Ling et al., 2017). |
| Nriv.00g150480 | 119.239 | 6 | XP\_008192803.1 | D2A1M1 | Disheveled-associated activator of morphogenesis 1-like Protein | This gene has main function in actin cytoskeleton organization. In *Drosophila*, it is important for trachea formation, Xenopus gastrulation, and muscle and wing development (Hayashi & Dong, 2017; Molnár et al., 2014). |
| Nriv.00g076490 | 199.232 | 3 | XP\_021942915.1 | A0A067RGE0 | Uncharacterized protein |  |
| Nriv.00g076550 | 199.232 | 2 | XP\_018579891.1 | NA | sphingomyelin phosphodiesterase 4 | This gene has function in sphingolipid-related metabolism. In bumblebee, this gene highly expresses during unpigmented pupa stage and the female adult after laying eggs (Han, Ding, Liu, Huang, & Wu, 2018). Other functions involves immunity and anti-stress mechanisms (Han et al., 2018). |
| Nriv.00g081990 | 103.924 | 2 | XP\_967769.1 | D6WMU4 | Non-specific serine/threonine protein kinase (EC 2.7.11.1) | This gene is related to signal transduction and can be associated with parasite infection (Boonkaew et al., 2020). |
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