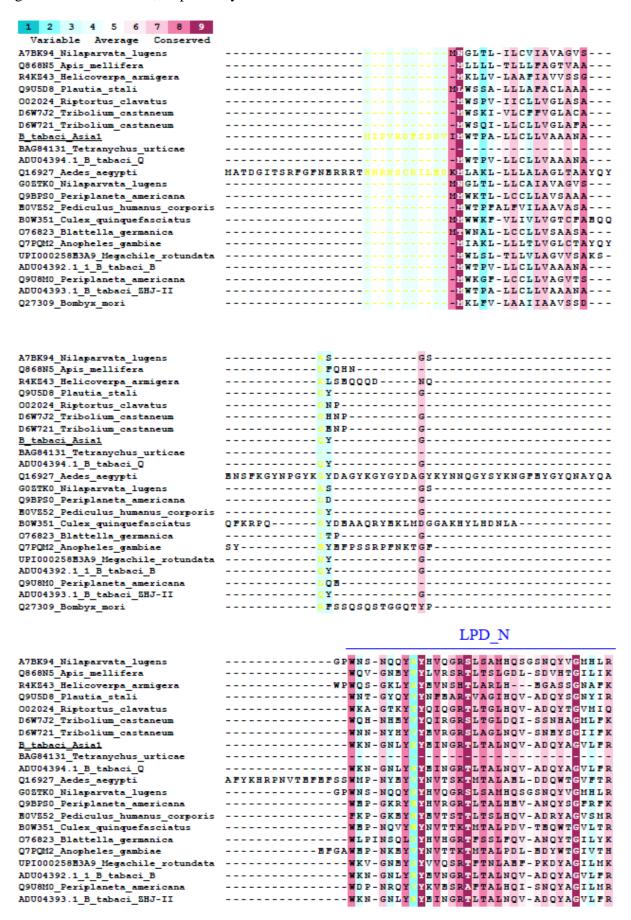
Supplementary file 4. Multiple sequence alignment of full length vitellogenin protein sequences of selected insects from each order. LPD_N, DUF1943, VWFD domains are underlined by blue, green and red colours, respectively.



LPD N

A7BK94 Nilaparvata lugens Q868N5 Apis mellifera R4KE43_Helicoverpa_armigera Q9U5D8 Plautia stali 002024_Riptortus_clavatus D6W7J2_Tribolium_castaneum D6W721 Tribolium castaneum B tabaci Asial BAG84131_Tetranychus_urticae ADU04394.1 B tabaci Q Q16927 Aedes aegypti GOSTKO Nilaparvata lugens Q9BPS0_Periplaneta_americana BOW351 Culex quinquefasciatus BOW351_Curex_quarta 076823_Blattella_germanica Q7PQM2_Anopheles_gambiae ADU04392.1_1_B_tabaci_B Q9U8MO Periplaneta americana ADU04393.1 B tabaci SHJ-II Q27309 Bombyx mori

ABL VBAKNENQAVFKISKABYADVHQNLSGGWQQBLRSNELQYKQLPLS ALL TVQAKDSNVLAAKV<mark>W</mark>NGQYARVQQSMP<mark>D</mark>GWBTBISDQMLBLRDLPIS AQFIVRVKYPGRLLAKLENPVHAQFNQQLPNNMAVP---SDLKYBTVQNL GKLYAYVEPDNKVTFQFQDAKYADFNEHFPEGWATDLHHYQFSYKSFPIK GQLTVRAESDNKATAVIENAKYAD LQANLSRGWDSEIQENELQYNELP I S AKL V V R P R S D G H L G A R I I E P Q Y A 3 I H S K L Y R S W D Q E I P D S E L S Y S P I S L S AQLYIQPRSDGNLGAKI<mark>S</mark>NAQYAKIHBBLSBGWBTBIPDSQVSYQQLPLS ANFYVQPFSSDRLSAYIQNABTAOVHABLPSGYBSHIPSSQLNYKSMPLS ANFYVQPFSSDRLSAYI<mark>Q</mark>NABTAQVHABLP<mark>S</mark>GYBSHIPSSQLNYKSMPLS AYLVIRPKSRDYVVAYVKQPBYAVFNBRLPYGYATKFYHDMFKFQPMPMS ABL : VEAKNENQAVFKI<mark>S</mark>KABYA : VHQNLS<mark>G</mark>GWQQBLRSNBLQYKQLPLS GKLVIBPHTPSVLRGQL<mark>K</mark>DTYHMTVHRMLP<mark>D</mark>GWDQKFBBRBSNWBRVGMK EOVES2 Pediculus humanus corporis NKLTLTPVKEDEYLGTFTQSEVTSVHTTLPGGVDHSVPLENAKYSPISLP AKMVINPKSDGYVVGRIDRAHYA FNQYLADGHRSBLSDLKLTWKPMPLS ARLSLDRNEDQLITGKV<mark>T</mark>BAQFSPVNTQFS<mark>S</mark>GWDBSVPDBKLHWDVVPMS GYLVIRPKOHNYVVAYI<mark>D</mark>RPMYAAFNBYLPRGYRTBLSRFNLKWQPMPFS UPI000258B3A9_Megachile_rotundata GYLTVQAKBDGKLTAKLTRGQYFHIHSNMSRGWD-----------ANFIVOPLSSDRLSAQIONABIAOVHTELPAGYESHIPSSOLNYKNMPLS AKLIIQPKTREELHAQL<mark>V</mark>EVEHSQINKELPSGWDQEIEIHD - - WQQLSAL ANFYVQPFSSDRLSAYI<mark>Q</mark>NABTAQVHABLP<mark>S</mark>GYBSHIPSSQLNYKSMPLS AQFTIRVKSPGRLQAKLENPQHGNFNBQLPDPRBLPV---DLKYQPTPNI

LPD N

A7BK94 Nilapaxvata lugens Q868N5 Apis_mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia_stali 002024 Riptortus clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B tabaci Asia1 BAG84131 Tetranychus urticae ADU04394.1 B_tabaci_Q ADU04392.1_1_B_tabaci_B Q9U8MO Periplaneta americana ADU04393.1_B_tabaci_EHJ-II Q27309 Bombyx mori

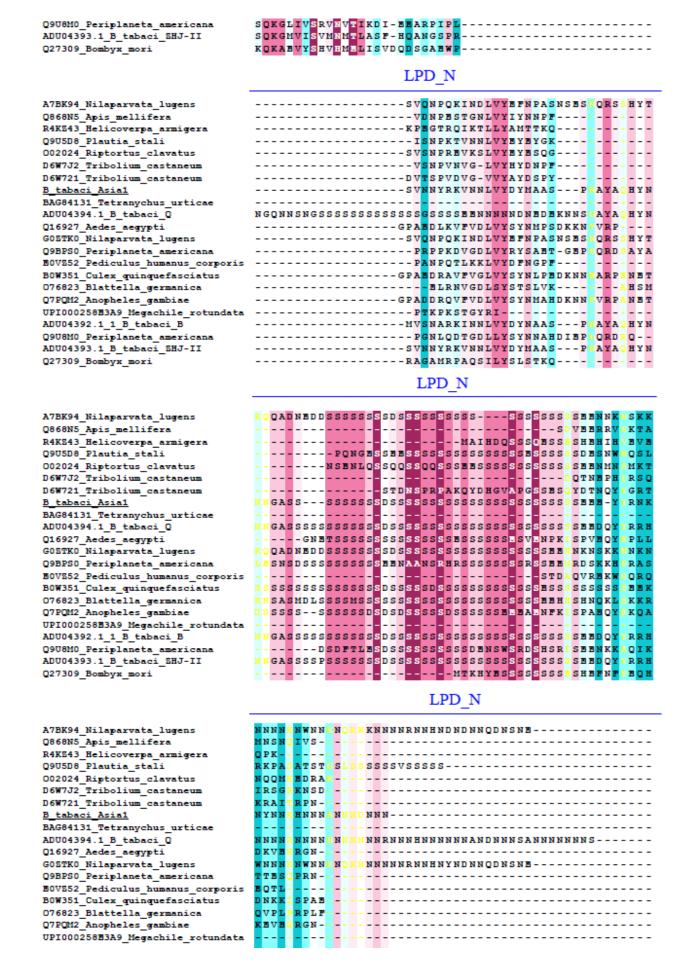
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G08TK0_Nilaparvata_lugens QANQVFQVNYK-QGAVRSLQVNRNTPTWBLNMIKGFVSLFQVDVTGQNAI
Q9BPS0_Periplaneta_americana N--KPFBVHVGNBFQFNKLIVTBDTPVWBTNMIKGVLSQIQVNLKBV--BOVE52 Pediculus humanus corporis R -- BPFVVKTK-DGIVDBLVVSKDLPVWHVNVIRSIVSQFQIDTQGRRLI BOW351_Culex_quinquefasciatus S -- KPFGIKYK - KGAIKGLYVEKTVPNHEVNILKSWVSQLQLDLFGANLI 076823 Blattella germanica Q - - QPFQIBLN SRGBVRKLRVNKFVBLWBINMIKAIISQLQVVVD - - - - Q7PQM2 Anopheles gambiae S - KPFGIYYN - KGAVKGFYVBKTVPNHBVNMLKGWVSQLQLDTQGAYVI UPI000258E3A9_Megachile_rotundata -------ESILDIVIVEEDVPNWEVVLLKSIISQFOVDIKGKKLV B--QPFBINLX-QGVVSNLRVNKNVSDWBLNIIKAVVSQIQVDTQGQNLK K--DAFAI<mark>ILO</mark>-NGHIVNVK<mark>V</mark>KDSTPNWAVNILKGILSTLOVNTQADNLV H--BPFBIYLK-KGVVSNLRVNKNVSDWBLNIIKAVVSQIOVDTQGQNLK D - - KVPBIBID - GGRIVSLD PPTSVPVPQBNLIKGLISALQLDTSAHRVI

LPD N

A7BK94 Nilaparvata lugens Q868N5_Apis_mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia_stali 002024 Riptortus clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B tabaci Asia1 BAG84131 Tetranychus urticae ADU04394.1 B tabaci_Q Q16927_Aedes_aegypti GOETKO_Nilaparvata_lugens Q9BPSO Periplaneta americana 076823 Blattella_germanica Q9U8M0_Periplaneta_americana

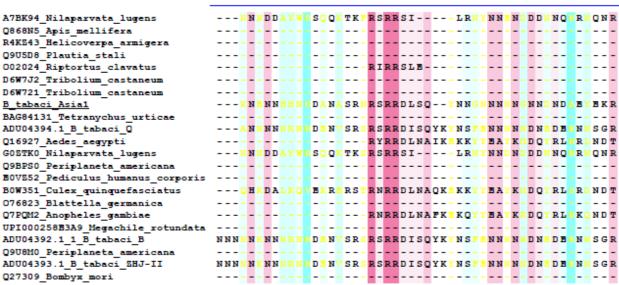
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BOW351_Culex_quinquefasciatus KSX YNQLPENE -- TANAVYKTMEPSVSGECETLYDVNVLPKYKIQSHDEW RHRYNILPNAS--TOSAVYSIRETTITGECEVEYDVSPLPALPLLQHPEL

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A7BK94_Nilaparvata_lugens	Q	QKG	VV	G I	LM	NA	TI	VS	V	SH	A S	SG	SP	0	
Q868N5_Apis_mellifera	R	QNG	LΨ	LS	RM	NL	TI	Αŀ	M	ВК	T S	ΚP	LΡ	4	-
R4KE43_Helicoverpa_armigera	K	QKA	Q V	H S	ΥV	QΙ	I	V S	V	BQ	D S	GΨ	BW		-
Q9U5D8_Plautia_stali	s	QKG	иv	GS	RV	NL	TI	DD	Y	s n	ľK	GS	VΡ		
002024 Riptortus clavatus	N	QKG	ΙV	V S	SM	NI	TI	QC	A	- T	G S	QG	SP		
D6W7J2 Tribolium castaneum	K	QRG	S T	R	ΙV	NI	TI	V S	M	DB	QN	QB	FB		
D6W721 Tribolium castaneum	Q	KKG	s v	N S	KЬ	NV	TI	ьç	v	ΑQ	PV	SB	NB	Y	
B tabaci Asia1														R	
BAG84131 Tetranychus urticae	-			۵-					-						
ADU04394.1 B tabaci Q	s	QKG	иv	I S	VΜ	NM	T	AS	F	- H	Q A	NG	SP	RNGHNG	HN
Q16927 Aedes aegypti	K	BPA	Lν	Y.	QΨ	NM	TI	NE	v	- H	PΥ	DΚ	VΡ	4	
GOSTKO Nilaparvata lugens	Q	QKG	vν	G	LМ	ΝA	Ŧ	V S	v	SH	A S	SG	SP		
Q9BPSO Periplaneta americana	s	QQG	I S	V S	RM	NV	TI	BE	I	- K	s Q	QH	ΙP		
BOVE52 Pediculus humanus corporis	N	QKG	v	IS	RV	ΝV	TI	vs	v	GΤ	G T	ST	GS	g	
BOW351 Culex quinquefasciatus		BKA	мv	LA	QΨ	ΝV	TI	NC	Į.	- K	R S	QK	BP	7	
076823 Blattella germanica	K	QKG	мь	v s	нІ	NV	TV	BF	K	GR	L	TV	ΙD	Y	
Q7PQM2 Anopheles gambiae															
UPI000258B3A9 Megachile rotundata							_							s	
ADU04392.1 1 B tabaci B														R	



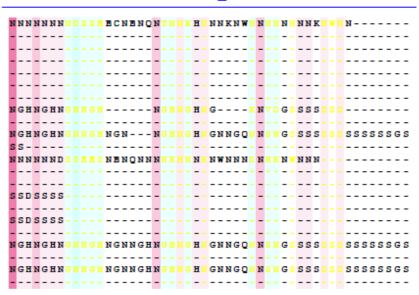
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Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia stali 002024 Riptortus clavatus D6W7J2_Tribolium_castaneum D6W721 Tribolium castaneum B tabaci Asia1 BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_Q Q16927 Aedes_aegypti GOETKO_Nilaparvata_lugens 076823 Blattella germanica Q7PQM2 Anopheles gambiae Q9U8MO Periplaneta americana ADU04393.1 B tabaci EHJ-II Q27309_Bombyx_mori



LPD N

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LPD N

A7BK94 Nilaparvata lugens Q868N5_Apis_mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia_stali 002024 Riptortus clavatus D6W7J2 Tribolium_castaneum D6W721 Tribolium castaneum B tabaci Asial BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_0 Q16927 Aedes aegypti GOSTKO_Nilaparvata_lugens Q9BPSO_Periplaneta_americana B0W351_Culex_quinquefasciatus 076823 Blattella_germanica Q7PQM2_Anopheles_gambiae

----NDNKNWNNNDNNNKNRNNDNDDSSSS-----SSSSSSSSS ----DNSLSSSBBKLKODILNIRTDISSSSS ---SRARRSSDRQQQBFNKDWRSSSSSDSS ----SSEETNYNGGLKRKTRSVTPPPHSSSS SSSAS-SSSSSSDES ----BQQSSINRKGKNARSQADSSSSSSSSS -----SSSSSSSSSSS ---- BSSSSHSQBSSNQIRRHKRSLSHASSB -----LQYTSFSLDNYQPDSI---SD-----SSDSSSSSSS ----BENDRYNNGKFASFARHEGSGSSSSSSS SSSBBNNSRYNNGKFASFARHNGS<mark>G</mark>SSSSSSS Pn sansasasasasasa ----DSSSSDSSSSSSSSESKERNGTSSYSS -----SSSSSSSSSS ----DNNKNWNNNNKNRNNNDNDDSSSSSS -----ssssssssss ----SRSRRSLQNSKRSINMYNDSSSSSSSSS _ - - - - - - - - - - - - - -BOVE52_Pediculus_humanus_corporis ----VKPTGYTEGGETEQVRNTRHIDEKTLV ----DDSSSSSSSSSSSSSSBSREHRKNGTLADN ------SSSSSSSSS

A7BK94_Nilaparvata_lugens Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia stali 002024_Riptortus_clavatus D6W7J2 Tribolium_castaneum D6W721 Tribolium_castaneum B_tabaci_Asia1 BAG84131 Tetranychus urticae ADU04394.1 B tabaci Q Q16927 Aedes aegypti GOSTKO_Nilaparvata_lugens Q9BPS0 Periplaneta americana MOVE52 Pediculus humanus corporis BOW351_Culex_quinquefasciatus 076823_Blattella_germanica Q7PQM2_Anopheles_gambiae UPI000258B3A9 Megachile rotundata ADU04392.1_1_B_tabaci_B Q9U8MO Periplaneta americana ADU04393.1_B_tabaci_EHJ-II Q27309 Bombyx mori

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LPD N

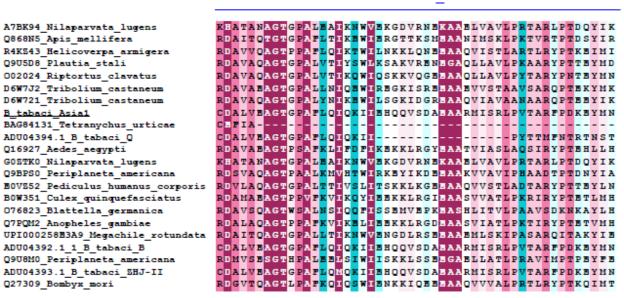
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Q7PQM2_Anopheles_gambiae UPI000258B3A9 Megachile rotundata ADU04392.1_1_B_tabaci_B Q9U8M0 Periplaneta_americana ADU04393.1_B_tabaci_EHJ-II Q27309 Bombyx mori

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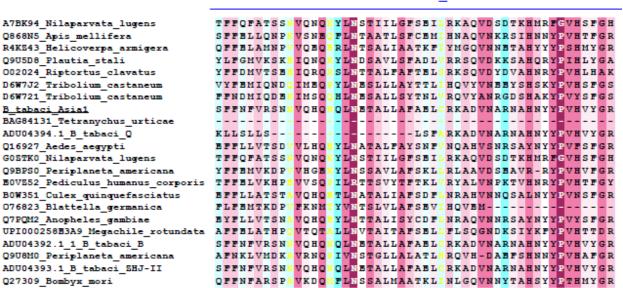
LPD N

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LPD N

A7BK94 Nilaparvata_lugens Q868N5 Apis mellifera R4KS43 Helicoverpa_armigera Q9U5D8 Plautia stali 002024 Riptortus clavatus D6W7J2_Tribolium_castaneum D6W721 Tribolium castaneum B tabaci Asial BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_Q Q16927 Aedes aegypti G0ETK0_Nilaparvata_lugens Q9BPSO_Periplaneta_americana 076823_Blattella_germanica Q7PQM2 Anopheles gambiae ADU04392.1_1_B_tabaci_B Q9U8MO_Periplaneta_americana ADU04393.1 B tabaci EHJ-II Q27309_Bombyx_mori



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A7BK94 Nilaparvata lugens Q868N5_Apis_mellifera R4KE43 Helicoverpa_armigera Q9U5D8 Plautia stali 002024 Riptortus clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B_tabaci_Asia1 BAG84131_Tetranychus urticae ADU04394.1 B tabaci Q Q16927_Aedes_aegypti GOETKO_Nilaparvata_lugens Q9BPSO Periplaneta americana

L-TSKHDQSLHQBYMPYLBBKIKSAFBKGDSQKIIVYIQALGNTAHPRLL L-TSKHDNSLYDBYIPFLBRBLRKAHQBKDSPRIQTYIMALGMIGBPKIL L-ARRNDR FVLDDIL PRLSEKLQQAIEKQEWSRAQVYIKAIGNLGHREIL B-ALNHFAVVIBKYIPYFQGQLRKAVQKGDSIQIQVYIRALANMGHPTVW N-SOBHROAVPOKYIPWLOBRLBRAVSRGDSIKAQVYIRALGNTAHPKIL FNTAQG<mark>WF</mark>YVKKEVIPYLSQKLDEAISNADTKQIHLYIRALGNVGHQQIL FRTTRG<mark>QE</mark>YVKKNVIPHLTRK<mark>I</mark>NBAINSADT<mark>QKIHIYIRA</mark>LGNVGHQQIL V-LPEHAKAVAHQYLPYYEQNLKRAVANGDSRKIQAYIRAIGNFAHPKIL L-ADADYKIIEHKIVPWFAHQLREAVNEGDSVKIQVYIRSLGNLGHPQIL L-TSKH<mark>GO</mark>SLHQBYMPYLBBK<mark>L</mark>KS<mark>AFBKGDS</mark>QKIIVYIQALGNTAHPRLL M-VPKNFSARVKBYIBYFANKLKNAVKDKDSHKIQVYTRALGNTGHADII BOVE52 Pediculus_humanus_corporis L-TRLDDTTVTDTYVPYLAQQLEQAVKEGDSTKVQTYVVGLGNVAHPKIL BOW351_Culex_quinquefasciatus L-ADSKYKIVAHKAVPWLAHQLRBAVQBADSBRIQVYIRAIGNLGHPBIL

076823_Blattella_germanica --H_VRDLKIKSVYIFYLVQBFDDAVKBNNSIKIQLYTHALGVTGNTHIL Q7PQM2_Anopheles_gambiae L-ADADYKIVAHKVVPWFAHQLRBAVKAGDSVKVQVYIRCLGHLGHPBIL UPI000258B3A9 Megachile_rotundata P-S-BOYLDIVNKYIPYLGVOLKKAVDDDDSARIOTYIVALGTIGMYBVL ADU04392.1_1_B_tabaci_B V-LPEHAKAVAHQYLFYYEQNLKRAVANGDSRKIQAYIRAIGNFAHPKIL LPD N KTFBPYLBGKKSASRFORLLMVASLYOMTRVHETTARAVLYRIYKNPGB A7BK94_Nilaparvata_lugens R4KS43_Helicoverpa_armigera QVFSPYLBGRIQVPTYLRVQMVVQLRSLAHQKDKYVRAVLYSILRNTAB
Q9U5D8_Plautia_stali AGFBPYLBGKYPVTDFQRLVMIAYLGDMIKVHPNTARSILYKIYQNEGD
002024_Riptortus_clavatus AVFBPYLBGKSQISBFQRLSIIASLDBMTRTHPNLARDVLYRIYQNTAB
D6W7J2_Tribolium_castaneum QSFKPYLBGTKKASHFQRTLMVVALDKLAKSNPQVARSVLYKIYQNAHD
D6W721_Tribolium_castaneum BAFBPYLBGQKKASHFQRVLMVVALDRLVBANPRVARSVLFKIYQNPSB
B_tabaci_Asia1 BVFBPYLBGKVPISNFORTVMVLSDNBLADWVDMTABUNTFUTTONDCC SVFBPYLBGKQQMTVFQRTLMVGSLGKLTBTNPKLARSVLYKIYLNTMB Q868N5 Apis mellifera EVFEPYLEGKVPISNFORTVMVLSLNELARVYPN ARNVLFKIYONTOE B tabaci Asia1 SVFBPYLEGTIQITDFORLAIMVALDNLVIYYPS ARSVLYRAYONTAD Q16927_Aedes_aegypti GOSTKO_Nilaparvata_lugens KTFEPYLEGKKSASRFQRLLMVASLYQMTRVHPTTARAVLYRIYKMPGE
Q9BPSO_Periplaneta_americana RHFEPYLVGRESVSTHERVTMVFCLDEFVKTQPSVAQYILLRLFEMVGE EOVESE Pediculus humanus corporis OVFEPYLEGKOPMSDFORTLVVTSLGKLAEVHPKVARTVLYKVYTNTGE BOW351_Culex_quinquefasciatus NVFEPYLEGKIPVTNFQRFAIVMSLDRLVENFPK ARTVLYRVYQNNAD O76823_Blattella_germanica HYLRPYIIQLKTITHHQRLFMVQSLERVVE: NPRXVIDLLLSLYLDQNE Q7PQM2_Anopheles_gambiae NVFEPYLEGKIPVTHFQRLAFIVALDRLVENYPR: ARSVLFKVYQNTGD UPI000258B3A9_Megachile_rotundata PVFEPFLTGREKMTAFOKTLILASLSNFVANHPKKALPGLKQIYMNTTE LPD N ABLRVAALHLLANANPSAAMLORMAQQTH<mark>W</mark>BQS<mark>K</mark>BVISATQSFIKSAARM A7BK94_Nilaparvata_lugens HEVRCTAVFLLMKTNPPLSMLQRMABFTK<mark>L</mark>DTNRQVNSAVKSTIQSLMKL YEVRVAAILNIFMAHPTASMMQVMAQMTNEDPS<mark>V</mark>QVRSALKSGIVSAADL PAIRVAA<mark>VMQ</mark>LMKTNPPASLLQRMAEHTNYDHSEHVNAAVKSAIESAANG Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia stali SEIRAAAVROLMRTNPPAOMLORMADFTNYDHS<mark>E</mark>QVNAAVKSAIESAA<mark>A</mark>C 002024_Riptortus_clavatus DQVRVAAVYQLMKSQPSAAMLQRMAYYTN<mark>V</mark>DTS<mark>N</mark>QVNAAVKSIIESACEL D6W7J2 Tribolium castaneum BQVRVAAVYQLMRTKPTSAMLORMASYTN<mark>V</mark>DTSDYVNAAVKSSIBFAADL QBVRVAAVFLIFGTNPSAOTLORMAQFTY<mark>B</mark>DQDQQVNAAVSSAIRNAAKK D6W721_Tribolium_castaneum B tabaci Asia1 BOW351_Culex_quinquefasciatus DEVRCAAAMLLMRTSPPVAMLQRMAEKTDENNSPQVSALVKSLIESAALT

O76823_Blattella_germanica ADIRVEALFLLMKADPSIHVLKMVAELTHTESNNQVLSASQSAIKSAANV

Q7PQM2_Anopheles_gambiae HEVRCAAVYLLIRTKPPVYMLQRMAEQTHYDPSTYVRAAVKTALESASEA

UPI000258E3A9_Megachile_rotundata QEVRCMALFLIPMTNPPLEVLREIVQFSNNDSSKQVKSAVKSTLQGLKHL ADU04392.1_1_B_tabaci_B QGVRVAAVFLIFGTNPSACTLQRMAQFTNBDQDQQVNAAVKSALBNAAKA
Q9U8M0_Periplaneta_americana HBLRCASVILLMRTQPPAAMLQRMABFSNIDPVKQVVSAVQSAIRSAANL
ADU04393.1_B_tabaci_EHJ-II QBVRVAAVFLIFGTNPSACTLQRMAQFTNBDQDQQVNAAVKSALBNAAKA
Q27309_Bombyx_mori YPVRVAAIQSIFISHPTG_MMQAMABMTHNDPSVBVRAVLKSAILSAABL **DUF!943** DQNPNSIBLARNAQAAVDMLNPN SYGSSLSKNFLSSFVIDNID-KSYBSQ - KDPHFWHLSRTAQAVRHIVTKENLGTRYSNKFFEDNYVNEDE-QGSFRA - DFYAYPELVRNARSAANLLTPKNYGFQYSQNFIKSYIAKEHDTLEYQHY BOVE52 Pediculus humanus corporis -KTKTNFQLRKNAQAAVNMLVPQVYGVQYSRLNLTDYLVQGLH-LGYTQT

DB FDDD SBLAQNARAAVKMINPN SYGLQYSSAHFRQYAMKBLD - ISYRLQ BOW351_Culex_quinquefasciatus 076823_Blattella_germanica -BGDIYSBMRRKAKAVBHLLSTRNMDVSYSKSYLYGYKSKKIN-YDSLYN
Q7PQM2_Anopheles_gambiae DBFDDDYBFSQNAQAAVKHLNPRDFSLQYSGTFLRDFAFKELE-LSYRMY
UPI000258B3A9_Megachile_rotundata -SDFBWQSLAKNAQAALKLLDSKDYDFLKSHBFIFNK-MKBBN-LFTNTL ADU04392.1_1_B_tabaci_B -HSESROBLAQAAQSAIALLSPKTYGLQYSKKWLRDYIVKEEN-LAYRVS Q9U8MO_Periplaneta_americana -K. PGNLNLARAARSAVNILNPMSMDIAYSNDILSSNMIQDMD-LGYKDN
ADU04393.1_B_tabaci_SHJ-II -HS BSRQBLAQAAQSAIALLSPKTYGLQYSKKWLRDYIVKBBN-LAYRVS
Q27309_Bombyx_mori -QHPRNFYLSRTAQAARYLVTNB.FGYQHSFKFIDDSYDBDND-IG-TFV **DUF1943** A7BK94_Nilaparvata_lugens LSSIGSVDSIIESSVFVNFMANDGGYKHQVFHHSAMFSSVNDLLELVNTQ LNY<mark>VGSEDSVIPRILYLTWYSSN</mark>GDIKV<mark>PSTKVLAMI</mark>SSVKSFMELS<mark>L</mark>RS VSYIGGDSKAMPKYQTYS<mark>WRDQI</mark>SGW--<mark>GF</mark>DTIGASFSDAQEIVDFLKQM R4KE43_Helicoverpa_armigera Q9U5D8_Plautia_stali O02024_Riptortus_clavatus FTYIKGLDGIYPSSVLYN<mark>LORKI</mark>GGYVHBPQTMSFMSSSSBBLLNHFFGQ CSSIQSQDS<mark>S</mark>LPSSLMYB<mark>VQQSV</mark>GGYHRDPHKFYFMTSSSBQAIN<mark>L</mark>MRQT D6W7J2 Tribolium castaneum FNYLVGEDSVLEKGINYYLQGKFGGVRXFVVDHQSAVSSIEDLVSVFQQQ
D6W721 Tribolium castaneum LQMLGGEDHAVERGMKYLLEKQFGGVYQQVINAHAMVSSIEDLVSVFQQQ
B tabaci Asia1 ADTIQGDDSLFENQYYAAFFRHVGGFNKRVASFRAFASSASDLYDRVADS BAG84131_Tetranychus_urticae ADU04394.1_B_tabaci_Q ADMIQSEDSLIPNQVYVALHRYLGGFAQRVASFRAMTSSASDLVEKIQEQ YGBIASNDHRYPSGLFYHLRQNFGGFK-KYTSFYYLVSSMBAFFDIFKKQ Q16927_Aedes_aegypti GOSTKO_Nilaparvata_lugens LSSIGSVDSIIPSSVFVNFMANDGGYKE
Q9BPSO_Periplaneta_americana YNQIGSRDSFMPKSVFYKLVNIIDGDRD QVFHHSAMFSSVNDLLELVNTQ DOAKFGGAVSSVRDVIDFIROO BOVE52_Pediculus_humanus_corporis LQYVGSKDSLIPSSVFYKVLGNVNTYKTTLLKVSSMVSSVQAVTBFLQNS BOW351_Culex_quinquefasciatus AGQIASDNHPVPTGAWLHWHENLGGLK-RLSSYHYIVSNMDALFDLLDNK 076823_Blattella_germanica LNYIGSEDSIYPKSMLLNIFTNNLGRINTHVQKGYMVSSMTDLWEAFHTI Q7PQM2_Anopheles_gambiae FSQIAADDHYVPSGFFFHLRKNMGGLK-RFSTFYYLISSMETFFDLLDKQ UPI000258B3A9 Megachile rotundata LNYIGSDNSPIPRTIYLATILYDGNFKGSPVBLMTMIPNMDSLIDALIPS ADU04392.1_1_B_tabaci_B ADMIQSEDSLIPNQVYVALHRYLGGFAQRVASFRAMTSSASDLVEKIQEQ
Q9U8M0_Periplaneta_americana MAHVGSSDSIIPNTILRKFNRYAGGQAHSDINFSEMVSSVKQLLKALRNP ADU04393.1_B_tabaci_EHJ-II ADMIQSBDSLIPNQVYVALHRYLGGFAQRVASFRAMTSSASDLVBKIQBQQ27309_Bombyx_mori ISHIGSBDSLIPNQVYVALHRYLGGFAQRVASFRAMTSSASDLVBKIQBQ **DUF1943** A7BK94 Nilaparvata_lugens Q868N5 Apis mellifera R4KE43 Helicoverpa armigera LG-----FGHHQHGPHHKPKMA Q9U5D8_Plautia_stali IA-------QQSGSYRKR 002024 Riptortus_clavatus D6W7J2_Tribolium_castaneum D6W721_Tribolium_castaneum TX-----BYRRLLXBKQAA T -----BYKROCOEKOHE FY------FABOYODKSF B tabaci Asial BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_0 FT----NGBEYOOOSE Q16927 Aedes_aegypti YNTKYFADYYKSADYSTNYYNFDKYSKYYKOYYYSKDSEYYOKFYGOKKD Q9BPSO_Periplaneta_americana B0VE52_Pediculus bween FK-----NNNNNNRRNNKSGSHDNEDN FK------KDDSODELEN BOW351_Culex_quinquefasciatus VM-------TVBEQKKEWRQESRQSRANEKQEKASK UPI000258E3A9_Megachile_rotundata DX------ADU04393.1_B_tabaci_EHJ-II FT-----NGBEYQQQSE Q27309 Bombyx mori DUF1943 HNNRN<mark>SNNEWTAENV</mark>LKALNIQ<mark>K</mark>DQAEQL<mark>.GNFFLTM</mark>LGGKRAFAI**N**NHT A7BK94_Nilaparvata_lugens

---Dr<mark>bt</mark>ii<mark>s</mark>aabkiabblkivpbblvplegnl<mark>minn×ya</mark>lkffpfdkhi ----<mark>an</mark>hr<mark>y</mark>tabkisbmlkikrnpqsplegaf**ffni**anqbrffsfdbsd Q868N5 Apis mellifera R4KE43 Helicoverpa_armigera Q9U5D8 Plautia_stali
O02024_Riptortus_clavatus
D6W7J2_Tribolium_castaneum
D6W721_Tribolium_castaneum QQKQG<mark>hh</mark>sd**y**tyqk**i**gbilngq<mark>ydd</mark>pvqv<mark>bgnf**ffsf**lgsprffaf**d**nht</mark> WSRNQHGSBQSYENILRSIHLHTDEPVQVEGNILVSGLGGKEFFTFDNHT ---QS<mark>antkw</mark>sseh<mark>t</mark>anlfnmq<mark>neqreql<mark>lgnlyfhv</mark>alqkmwsfdnqt</mark> ---QSVNYPWSSENIAKLLHLQNEQREQLEGSLYLQMGALQTIFSFDNHT ----BKFSKYSABBIFKNFNFKADYPKBL.AYFQYYFLGSKQYSFINBBI B_tabaci_Asia1 BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_Q ----<mark>MNQQF</mark>SABQIFRQFNIKPDYPQBV.ALLQYTV:GAKRWAFFDBBF Q16927 Aedes aegypti YYNDKEPFKFTAPRIAKLLNIDAEEAEQLEGQLLFKL NGYFFTAFDNQT 076823_Blattella_germanica Q7PQM2_Anopheles_gambiae ADUU4392.1_1_B_tabac1_EHJ-II Q27309 Bombyx mori

EOVESE Pediculus humanus corporis ----HGDAYTVEKITKLLNVEQLVEGUVEGVEGNERYRVONLHRFFVYDNHT BOW351_Culex_quinquefasciatus KQDNKABQKWSTGRIAKLLNIDPEDVBQVLGQLWLBI:NAPHLIAFDNNT ---KDNGSPTDPKTLVKF------VEGNLKYFNMGVQKFWAFDNTT -KNQBBFQKWSTTRIAKLLNIDPBBABBLEGQFMFQI NGBRFFAFNNQT UPI000258E3A9 Megachile rotundata ----RSLVKMATEKIAEELNIVGDIPVLLEGNFLWRTKFLSRFIPYDENT ADU04392.1_1_B_tabaci_B ----- MNQQFSABQIFRQFNIKPDYPQBVBALLQYTVFGAKRWAFFDBBFQ9U8M0_Periplaneta_americana ----- RRBPVADRRBFNIPPIIIDIAPPLBGNMMLRWLGNDRFFSYDKNDADU04393.1_B_tabaci_EHJ-II ----- MNQQFSABQIFRQFNIKPDYPQBVBALLQYTVFGAKRWAFFDBBF ----DRAHKYSAEKIAKLLNIKNDEEEPLLASFYVDFMNNQRLFSFSESD

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A7BK94 Nilaparvata lugens Q868N5 Apis mellifera R4KE43_Helicoverpa_armigera Q9U5D8 Plautia stali 002024 Riptortus_clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B_tabaci_Asia1 BAG84131 Tetranychus urticae ADU04394.1 B tabaci Q Q16927_Aedes_aegypti GOSTKO_Nilaparvata_lugens B0W351_Culex_quinquefasciatus 076823_Blattella_germanica Q7PQM2_Anopheles_gambiae Q9U8M0 Periplaneta americana ADU04393.1_B_tabaci_SHJ-II Q27309 Bombyx mori

MRRSPSIFKBAAQKLKHT - SFNLTQFYSKNTMKVAFETPMGLEFVYTSSV LDKLPTLISNYIBAVKEG-KFMNVNMLDTYESVHSFPTETGLPFVYTFNV LIRLVQDVM5YMK5L5QGVDKHYTKVFNAHQVSVMFEVASGMEFIYKYK IBOIPOWIKHIHOKLOKGLNFHETKYYNOYSVEIGFELATGVEFIYSYN: IBQIPQFFSNI<mark>N</mark>BKLQDK<mark>S</mark>YVQHTKYYNQYSLBIGFPSAMGLPFVYH<mark>L</mark>DV IBNLLQ<mark>I</mark>VRKCBQDLKNG<mark>K</mark>HIDYNKMSVNYBTALSFPSAWGLPLIYTFDV MENLPELVRKWEDE FRONKHYAYSKMMIAQESSLALETVLGLEFIYTYDR FNQIPROLESALNKAANGYSFNNTKFYNDFALTIGFETATGLEFSYTIKL FNQIPRRLNDALSKVQNGQSFNSTKFYNDISLSLAFPTATGLPFSYTLKV IBNLPHKMRHLFBNLBDGYAFDVTKFYQQQDVVLAWPLATGFPFIYTLKA IBKIPS**I**FKBA<mark>A</mark>QKLKHT-SFNLTQFYSKNTMKVAFETPMGLEFVYTSS Q9BPSO Periplaneta_americana FB-FRBELKKYFKKPQIT---NINKLYNRMBLKVGYPNVMGVPFFFTFKR BOVE52 Pediculus humanus corporis IBTLTQTLNKYTQKTGQGLAYNTQKFFTNYBITLALPTTTGVPLVYTLS IDBLPRVIKKFMKDLBVNWSVNITKVYQQGLVTVAMPLBTGFPFTFSTQS FSNASA<mark>WIQBFL</mark>KTYKKP<mark>T</mark>NFNHTKLSSS<mark>S</mark>SITLTLECAMGLEAYFK**M**NS IBQFPSLVKKYFBDFBDGFAYNMTKFYQQNVVTMAFPLATGLPFHYSLK: UPI000258B3A9 Megachile rotundata VRNLPNKVVBHLTARKDG-AFHNTHILNLHEMMIDDTDTGLPFVYSLC ADU04392.1_1_B_tabaci_B FNQIPRRLNDAPSKVQNGQSFNSTKFYNDISLSLAFPTATGLPFSYTLKV IKQLFRNYNAAALPLADMHMLDDMKVYNQKSLAIAFENALGLESLFTIDV FNQIPR<mark>R</mark>LNDA<mark>L</mark>SKVQNG<mark>Q</mark>SFNSTKFYND<mark>I</mark>SLSIAFPTATGLPFSYT<mark>L</mark>KV LQQLSQYISBYMKKVBSGABKHYTKVYNQDQVSIMFPVASGMPFIFKYK

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A7BK94 Nilaparvata lugens Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8_Plautia_stali 002024 Riptortus clavatus D6W7J2_Tribolium_castaneum D6W721 Tribolium castaneum B_tabaci_Asia1 BAG84131 Tetranychus urticae ADU04394.1 B_tabaci_Q 076823_Blattella_germanica Q7PQM2_Anopheles_gambiae Q27309 Bombyx mori

PTMVYVGGBTKVNSHPDLA-----NGNNNFVNIPQYINISADIBAVY PTLFYADVBAKGHLLQBQG------KDBYYQVPYKASSEGTYKFTW PTLASVSGKWSGQVBLQQH-----QKBQNEKYSIPVKGQVHGDFEFVY PTLVHIBSEMQASANPSVY-----SEQGLQQPETVDLEYKINAFV PALIRVEGNUKUETNPHIS-----SGDSLKKPDNVNVDFDIHAVI PTLLNFGGBVKAKVQGFKA-----DNNKFRIPBAVNVTAAIDVTY - - - - - - - - - - - - - - - - -_____ PTLVQAGGEVQARVQGHNS-----NNNNNLFRIPBAVNVTABIBIVY BOVE52 Pediculus humanus corporis PVYIGIKGKVQTDVPBLRQ-----TQKGYQVPKTLGVTTNVBVTV BOW351_Culex_quinquefasciatus PTLVKLBVDASAETMPNMARKPAGHPBNGNDBHIHIPLSANVTADVNVVY PSLWKYNGEFSIQTDAK-------TDVPMSLENFMNITGSINLMF PTLMKFBFBASATTYPSIFKTPTGYPBKBNDDFIHMPRWFNGSADVNMAY ADU04392.1_1_B_tabaci_B PTLVQAGGEVQARVQGHNS----NNNNNNNLFRIPBAVNVTABIBIVY Q9U8MO_Periplaneta_americana PTVLRANSTFRLLLNNTSS-----BSSSIBVLPWKLGARSBTSLTY
ADU04393.1_B_tabaci_EHJ-II PTVLQAGGEVQARVQGHNS-----NNNNNNNLFRIPBAVNVTABIBIVY
027309_Bombur_mori PAVIHFQSKLKGK SFPSK -----DNKYYB----ANMIKDVQFTY

DUF1943

A7BK94 Nilaparvata lugens Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia stali 002024 Riptortus clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B tabaci Asia1 BAG84131 Tetranychus urticae ADU04394.1 B tabaci Q Q16927 Aedes aegypti GOSTKO_Nilaparvata_lugens

SMQSNSKFGMVAPFNHHBYYASVEKNMQFYMA-VQTBANIDLENNEVEF SKNVQGRVGFVTPFBHRHFISGIDSNLHVYAP-LKISLDVNTPKGNMQW ARNID GNV GFMD TL SNQLAS AG VVRKY QVNVP - - - VKM SIQMNAGVLK M SSQKWGKLGFIAPFNNQKYLAVVBKNTQFYVP-FQGKL;FNGPBQYFQA SAQKSGLMGFVAPFSQNRYIAGLEKNIHAYVP-VQAKV:YNPEENKVQA SGRVQSQLGFFAPFNHKRYSSGYDKNFQVVVPQISGKVHLNVENKQATL SGRVQTQFCIFTPFDHQRYSAGYNKNFQLVVP-LNGKM:LDVQKKQLKM STKLBTKFGFVTPFDHQRYVAGVDKNINFNLP-LKFNVNLDVYNTKABI ------YDVKKDSASL ATBLKSBLGFVTPFNHBRYVAGLAKNIFVNIP-VK<mark>V</mark>AANVDIANTKVB**F** HRMVDAKVGFVTPFDHQRYIAGYQKKLHGYLP-FNVBLGLDFVKDBYBF SMQSNSKFGMVTPFNHHBYYASVEKNMQFYMA-VQTBANIDLENNEVEF

Q9BPS0_Periplaneta_americana SFDMHSHMGVVAPFNKKEYVTGIQRKHMIQIP-LNVSVHVNLDKNKVA BOVE52 Pediculus humanus_corporis STNTHGQISFIVPCBHKRFVSGYKKVVHVNVP-LKGSVTVDLPKRNVKVB0W351_Culex_quinquefasciatus SRLIDAKVGFNTPFDHQRYIAGFQKKHHIHAP-LRLBA_LDNAQNBYBL BOW351_Culex_quinquefasciatus SRLIDAKVGFNTPFDHQRYLAGFQRAHALIA.

SQMYHAQLAFSTAFDNKBYISGLDRKVBVHVP-VKFQINLDFKNHNGFI

SQMYHAQLAFSTAFDNKBYISGLDRKVBVHVP-VKFQINLDFKNHNGFI SRLVDAKVGFITPFDHQRYVAGYQKKFQGYLP-FSFDFGFDFENNDFE<mark>V</mark> Q7PQM2_Anopheles_gambiae UPI000258B3A9 Megachile_rotundace

ADU04392.1 1 B_tabaci B

Q9U8M0_Periplaneta_americana

SVKBMSKIAIVTPFNSMBHMAALBRNILINIP-IKLDVDFDLBAQSIGA

ADU04393.1 B_tabaci_EHJ-II

ATBLKSBLGFVTPFNHBRYVAGLAKNIFVNIP-VKVAANVDIANTKVEP

COCCOOR BOMBOW mori

AINIDGNVGFMDTLSNQYSSVGVVNKLQFNIP---EKFGIBIKSGLIKE UPI000258E3A9_Megachile_rotundata VQKTQRNIGFVTPFDHRHFVAGVDKHTQVYLP-LKTSV:VSAPKKSVQL DUF1943 VQPLNKE--DKQNVFQYSSVLYTTKSNILNFNPNNQED--GTERVHVGK IWPMKGB--BKSRLFHYSVVPFVSNHDILNLRPLSMBK--GTRPMIPDD

A7BK94_Nilaparvata_lugens Q868N5 Apis mellifera R4KE43_Helicoverpa_armigera Q9U5D8 Plautia stali 002024 Riptortus clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B_tabaci_Asia1 ADU04394.1 B_tabaci_Q Q16927_Aedes_aegypti

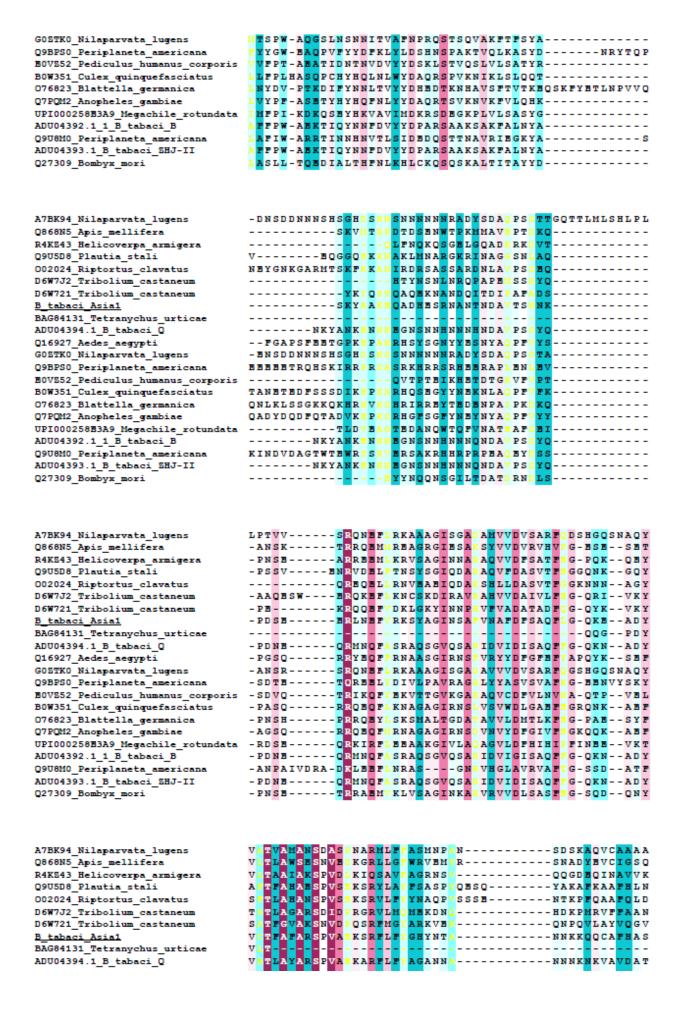
VEPLRPD - - QDYMIAHFSV V PYTAIQKKDTLVPYSQDP - - TTKIVERLR IQPYSQEGSEQQXIPQHSTDIYTTYHNLYDIKPYAEGT--YARPVHYS<mark>S</mark> LQFLAQQKQBBQOVFQYSSNAYTTYQKSSDLTPYLQGB--NTQAVYAKA ABNTDSQ--KNTNLVHYSSWPYTSVYBIFDVBP-----KNQIIBKBN LQNPGSQ--ESVRLAHYSS*PYTSQGDIYTPKP-----DLKIIHSQR VKPLNNQ - - HBORVFHYSSYPYMAFYSIFDFAPVOFNK - - NMKKIQTNN MKPMNNQ--NBQKIFHYGSYPYTALQNIPDFRPLQBNB--NTKYIFANB FKFLEPK--DDHLLFHMSS*PYTGYKDITDMRPIAENP--NAKIVHDDN EOVE52 Pediculus humanus corporis VKPVEKR--GDYKLFHYSTVPYTAVQNILDLKPVSESP--SFTVLNTKP ADU04392.1_1_B_tabaci_B MKPMNNQ--NEQKIFHYGSYPYTAIQNIFDFRPLQEME--NTKYIFANE
Q908M0_Periplaneta_americana MKLIGKD--SNPRLAQLSTNTYTTNHKITIIKPAIQDE--BANEIHVRP
ADU04393.1_B_tabaci_EHJ-II MKPMNNQ--NEQKIFHYGSYPYTAIQNIFDFRPLQEME--NTKYIFANA
Q27309_Bombyx_mori VEPLHPD--QDQTLVHYSVWPYSASQKKDSLVAISQDP--ATKIVERRS

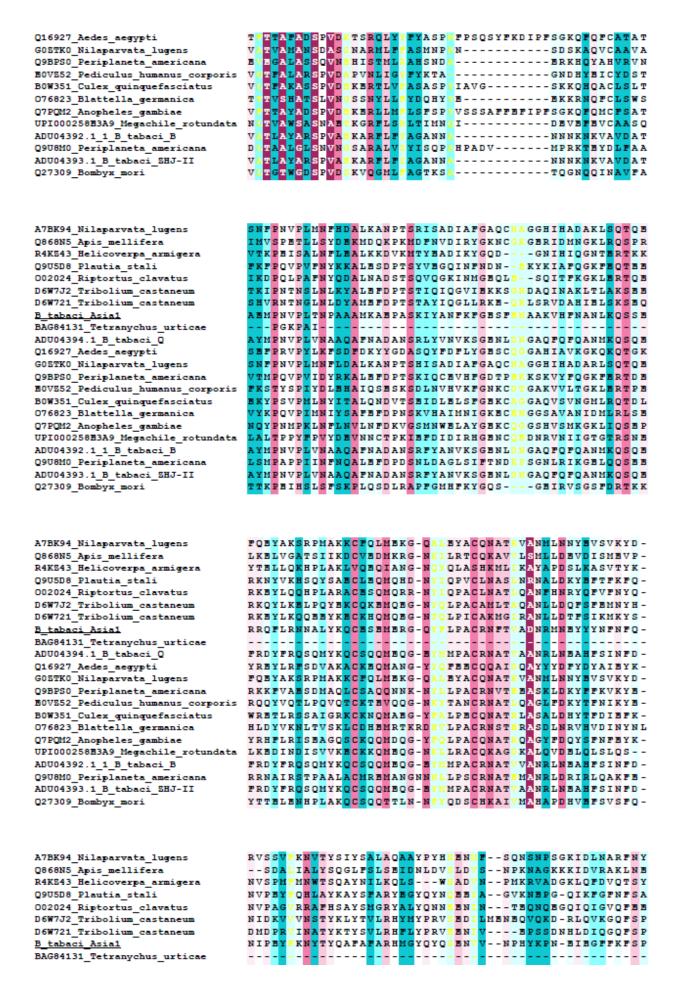
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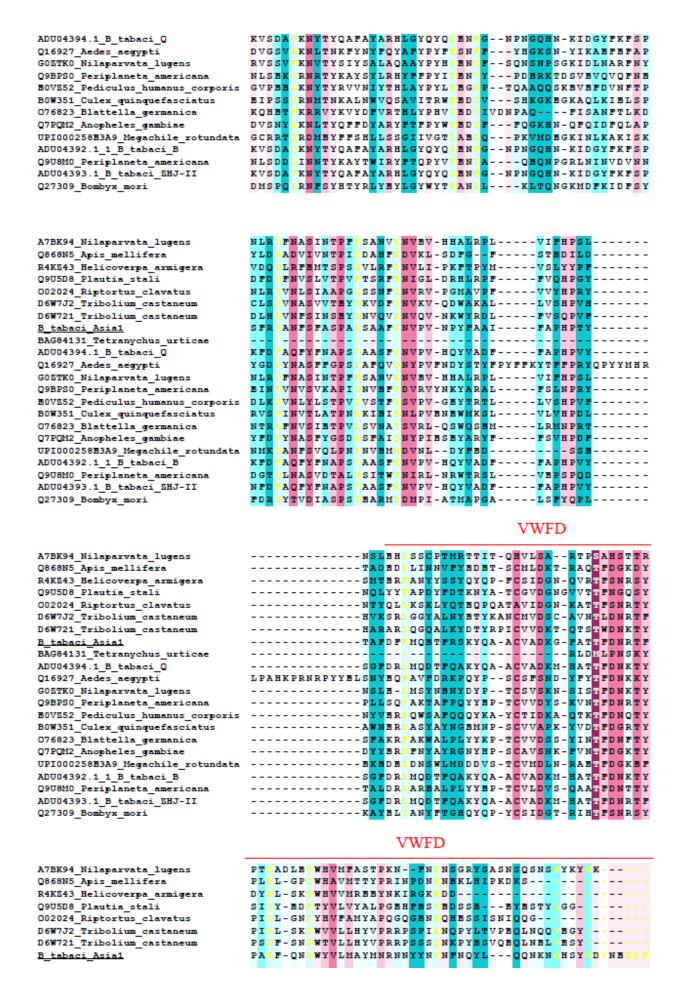
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A7BK94 Nilaparvata lugens Q868N5 Apis mellifera R4KE43 Helicoverpa armigera Q9U5D8 Plautia stali 002024_Riptortus_clavatus D6W7J2 Tribolium castaneum D6W721 Tribolium castaneum B tabaci Asia1 BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_Q Q16927 Aedes aegypti

MTSPW-AQGSINSNNITVAFNPRQSTSQVAKFTFSYA------LPYPW-TMDNBRYVKVDMYMNLBGBQKDPVIFSTSFD------------AVRDIALTHYNLRYLGKQSQNKVLTLTAAYD------AFYHD-LVHSMANNYYAVSFDPRNSSPBKVVFRAYYD------N LGSW-VDDNMQHIQIDLGIDSDKSTTNKVVVHLGHQ--------LDPW-IDDTIQYVHIDVGIDSGKSTAQQVNLHLGYK---------FYPW-ABQBIKQNDFNFYFNPSASDNKAAKFTFNYA--------AFFPW-ABKTIQYNNFDGYYDPARSAAKSAKFALNYA--------VNYPF-AYQPYEYHQFNLFYDSQRTHAKSFKFYAYQK---------







PLHMQQNNWY<mark>V</mark>LMAYVNRNN<mark>YY</mark>NNQYNS<mark>YF</mark>--QGNNKNQYS<mark>Y</mark>RDYNQKRF BAG84131 Tetranychus urticae ADU04394.1_B_tabaci_Q FYDM-GECWHAVMYTVKPDY<mark>DFYAQQSHFY</mark>NSDFEYKYKNGFEEYEQ---SADL--EGWHVMFASTPKN-<mark>-Y</mark>NDN<mark>SGRYS</mark>ASN<mark>S</mark>QSNSFYKYKK-----Q16927 Aedes_aegypti GOSTKO_Nilaparvata_lugens BOW351_Culex_quinquefasciatus DYST-GTCWHVAMHTVKPBLBVSPBHSHFYASDVBQRWSNGFDBHBQ---SAHH-----IVONDAFYTILDIPQKFNMEY:-----UPI000258E3A9_Megachile_xotundata PLKL-SSCWQVLMTTYFRLNPRKPSEKLAMSEDES-----------ADU04392.1_1_B_tabaci_B PLHMQQNNWYVLMTYVNRNNYYNNQYNSYF--QGNNKNQYSYRDYNQKRF Q9U8M0_Periplaneta_americana PLTL-SSAWHMMLQYQPKRSQDDENLDDVPDIIRPP------ADU04393.1 B tabaci EHJ-II PAHF-QNNWYVLMAYMNRNNYYNNNFNQYL---QQNKNQHSYRDYNBKRF BYPL-SRSWHVVMQDBSTQRGNWHB------------Q27309 Bombyx mori

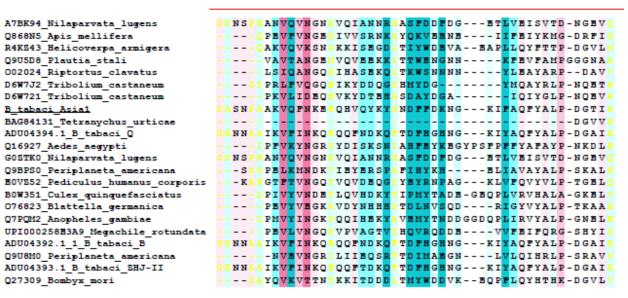
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VVVLAKNA -- GSORKAVKMLL -- G---- BNV ID IN PSGSB----- S -VSVLSREN--BAGQKEVKVLL--G----SDKIKFVPGTTS-------LVILARRP -- SQQQQBIYISY -- KTBTGKDL IBIQPAQSA -- -- --FSVVAKDY--GSNOKEGRILLD-----DDKIEMRPSGNG-------YAVLVKET--DSEHKEVKVIL--G----SDVIELKSKSSG-------- IVYGRSY--GDAKKBIKMVIQSPDTLSKVIDISLKPSB<mark>SS</mark>-------- IVYARAS BOSHS QKBIQIVLQMPCTNGKVVK IAMKPSSKG------YSAVLARDN -- SHGQKELKVVLNNG----EYDFNFEPASQN-AGFSNSF YTTDYARQT -- SNGQKELKIVLNNG---- EYEIFMQPASSQAGLESSNS -FAALARRG--SDNQLYFKFLF--G----DNYIEVFPNNGG------BOVE52 Pediculus_humanus_corporis - FSVLVREV--ENNQKEVQFTFNYAK----GPVVNVLFQPQG-------- ITILARHG - - BDNQLFLKAIL - - GQYKQNDYN IDIIPHGHB - - - - - - -UPI000258B3A9_Megachile_rotundata -VSILARBI---NGQKBVKVIL--G----QN:ILLLFGSBL-----ADU04392.1_1 B tabaci B YTTVYARQN--SNGQKBLKIVLNNG----BYSIFMQPASSRAGLHSSNSQ9U8M0_Periplaneta_americana -VAILARBT--SNRRKBILMNL--D-----HTIVAFKPTSBV------ADU04393.1 B tabaci EHJ-II YTTVYARQN--SNGQKELKIVLNNG----BYEIFMQPASSQAGFHSSNS -LAILSRRQ -- QRD QQEIYISY -- KSESGQDL IBIQPASGD -- -- --

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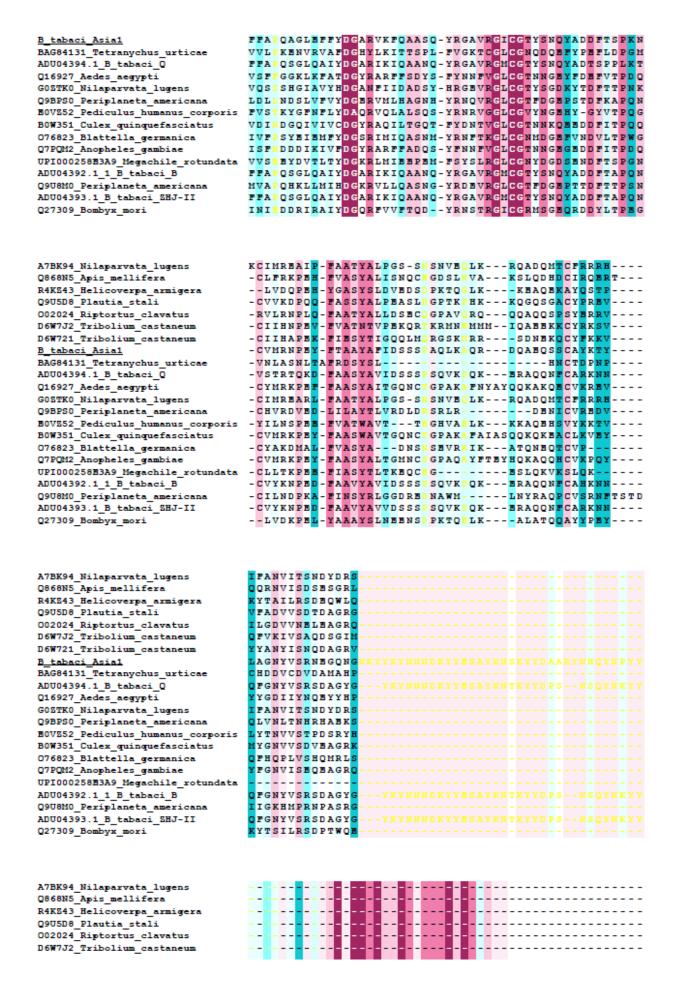
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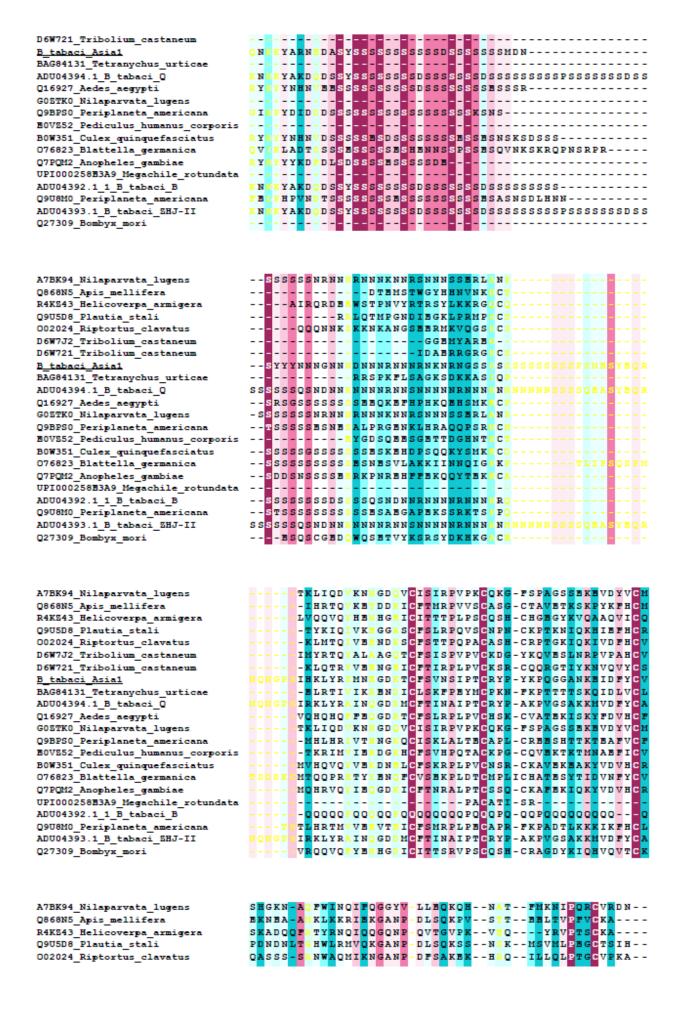


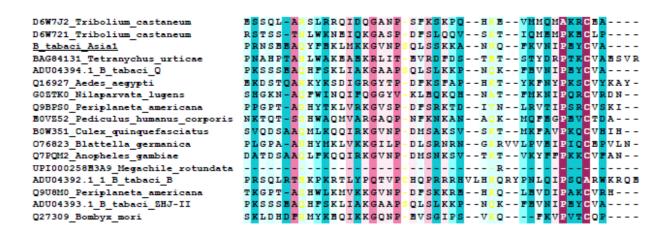
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VQSSSHGIAVYHDGAN FIIDADSY-HRGBVRGLCGTYSGDKYSPLHPBKN LTSDKFDVSLALDGERVMLKASED-YRYSVRGLCGNFDHDSTNDFVGPKN R4KE43_Helicoverpa_armigera LNIRDGRLRAMYDGQRLVLTTQD --YRTTTRGICGQNSGBLREDYETPNG FFFPNHGLEVYYDGKRLVVSVSNH-HRDRVRGICGTMDGEPSYDFTTPAN LSLPQQGIELTYDGARVQLSASSS-YKGNVRGLAGTFDGQEANDFTTPNN VQVYN-AFSVIYDGVRAKIBITNDKFRDAARGLCGTFTNBQBTDFTHPGN LBIRD-AFYAIFNGQTLKLTATNSKFRDASRGLCGTFTGBQBTDFLGPDN







A7BK94_Nilaparvata_lugens Q868N5_Apis_mellifera R4KE43 Helicoverpa armigera Q9U5D8_Plautia_stali O02024_Riptortus_clavatus - -D6W7J2_Tribolium_castaneum D6W721_Tribolium_castaneum - -B_tabaci_Asia1 GΙ BAG84131 Tetranychus urticae ADU04394.1 B_tabaci Q Q16927_Aedes_aegypti GOSTKO_Nilaparvata_lugens - -- -- -Q9BPSO_Periplaneta_americana BOVE52 Pediculus humanus corporis --BOW351_Culex_quinquefasciatus --076823 Blattella germanica Q7PQM2 Anopheles_gambiae UPI000258B3A9 Megachile rotundata - -ADU04392.1_1_B_tabaci_B N G Q9U8M0_Periplaneta_americana ADU04393.1_B_tabaci_EHJ-II - -_ _ - -Q27309 Bombyx mori