

**Table S1.** Basic information of 106 sequenced baculovirus genomes in GenBank.

Genus	Virus <sup>a</sup>	Abbreviation	Accession no.	Strain/isolate	Length(bp)	ORFs	G + C (%)	Reference
Alphabaculovirus (Group I)	Autographa californica NPV	AcMNPV	NC_001623	C6	133894	156	40.7	[1]
	Anticarsia gemmatilis NPV	AgMNPV-2D	NC_008520	AgMNPV-2D	132239	158	44.5	[2]
	Anticarsia gemmatilis MNPV	AgMNPV-37	KR815466	AgMNPV-37	131855	156	44.5	[3]
	Antheraea pernyi NPV	AnpeNPV	NC_008035	Liaoning	126629	147	53.5	[4]
	Antheraea pernyi NPV	AnprNPV	LC194889	Liaoning	126593	150	53.3	-
	Antheraea yammamai NPV	AnyaNPV	LC375537	Nagano	126270	152	53.3	-
	Bombyx mori NPV	BmNPV	NC_001962	T3	128413	143	40.4	[5]
	Bombyx mandarina NPV	BomaNPV	FJ882854	S1	126770	133	40.2	[6]
	Catopsilia Pomona NPV	CapoNPV	KU565883	416	128058	131	39.7	[7]
	Choristoneura fumiferana DEF MNPV	CfDEFMNPV	NC_005137	-	131160	149	45.8	[8]
	Choristoneura fumiferana MNPV	CfMNPV	NC_004778	-	129593	146	50.1	[9]
	Choristoneura murinana NPV	ChmuNPV	NC_023177	Darmstadt	124688	147	50	[10]
	Condylorrhiza vestigialis MNPV	CoveMNPV	NC_026430	-	125767	138	42.9	[11]
	Choristoneura rosaceana NPV	ChroNPV	NC_021924	NB_1	129052	149	48.6	[12]
	Cyclophragma undans NPV	CyunNPV	KT957089	Whiov	142900	147	45	[13]
	Dasychira pudibunda NPV	DapuNPV	KP747440	ML1	136761	161	54.4	[14]
	Epiphyas postvittana NPV	EppoNPV	NC_003083	-	118584	136	40.7	[15]
	Hyphantria cunea NPV	HycuNPV	NC_007767	-	132959	148	45.5	[16]
	Lonomia obliqua MNPV	LoobNPV	KP763670	SP/2000	120023	134	35.7	-
	Maruca vitrata MNPV	MaviMNPV	NC_008725	-	111953	126	38.6	[17]
	Neophasia sp. alphabaculovirus	NespNPV	MK293724	11	129018	144	44.6	-
	Orgyia pseudotsugata MNPV	OpMNPV	NC_001875	-	131995	152	55	[18]
	Oxyplax ochracea NPV	OxocNPV	NC_043529	435	113971	124	31.1	[19]

Genus	Virus <sup>a</sup>	Abbreviation	Accession no.	Strain/isolate	Length(bp)	ORFs	G + C (%)	Reference
Alphabaculovirus (group II and other alphabaculoviruses)	Philosamia cynthia ricini NPV	PhcyNPV	JX404026	GX-1	125376	138	53.7	[20]
	Plutella xylostella MNPV	PlxyMNPV	DQ457003	CL3	134417	153	40.7	[21]
	Rachiplusia ou MNPV	RoMNPV	AY145471	R1	131526	149	39.1	[22]
	Samia Cynthia NPV	SacyNPV	LC375538	Nagano	126094	152	53.3	-
	Samia ricini NPV	SariNPV	LC375541	Guangxi	125921	149	53.5	-
	Spilosoma obliqua NPV	SpobNPV	KY550224	IIPR	136141	135	45.4	-
	Thysanoplusia orichalcea NPV	ThorNPV	NC_019945	P2	132978	145	39.5	[23]
	Adoxophyes honmai NPV	AdhoNPV	NC_004690	ADN001	113220	125	35.6	[24]
	Adoxophyes orana NPV	AdorNPV	NC_011423	English	111724	121	35	[25]
	Agrotis ipsilon MNPV	AgipMNPV	NC_011345	Illinois	155122	163	48.6	[26]
	Agrotis segetum NPV	AgseNPV-A	NC_007921	A	147544	153	45.7	[27]
	Agrotis segetum NPV B	AgseNPV-B	NC_025960	B	148981	150	45.7	[28]
	Apocheima cinerarium NPV	ApciNPV	NC_018504	-	123876	118	45	-
	Artaxa digramma NPV	ArdiNPV	MN233792	424	161734	149	39.1	[29]
	Buzura suppressaria NPV	BuzuNPV	NC_023442	Hubei	120420	127	36.8	[30]
	Chrysodeixis chalcites NPV	ChchNPV	NC_007151	-	149622	151	39	[31]
	Chrysodeixis includens NPV	ChinNPV	KU669289	IA	140808	142	39.2	[32]
	Clanis bilineata NPV	ClbiNPV	NC_008293	DZ1	135454	129	37.7	[33]
	Cryptophlebia peltastica NPV	CrpeNPV	MH394321	SA	115728	126	37.2	[34]
	Ectropis obliqua NPV	EcobNPV	NC_008586	A1	131204	126	37.6	[35]
	Euproctis pseudoconsersa NPV	EupsNPV	NC_012639	Hangzhou	141291	139	40.3	[36]
	Helicoverpa armigera MNPV	HearMNPV	EU730893	-	154196	162	40.1	[37]
	Helicoverpa armigera NPV NNg1	HearNPV- NNg1	AP010907	NNg1	132425	143	39.1	[38]
	Helicoverpa armigera NPV	HearNPV-C1	AF303045	C1	130759	137	38.9	[39]

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	Helicoverpa armigera NPV G4	HearNPV-G4	NC_002654	G4	131405	135	39	[39]
	Helicoverpa assulta NPV	HeasNPV	MG569706	HasNPV-DJ0031	129801	128	38.8	-
	Hemileuca sp. NPV	HespNPV	NC_021923	-	140633	137	38.1	[40]
	Hyposidra talaca NPV	HytaNPV	MH261376	HytaNPVIndia001	139089	141	39.6	[41]
	Lambdina fiscellaria NPV	LafiNPV	NC_026922	GR15	157977	137	43.7	[42]
	Lymantria dispar MNPV	LdMNPV	NC_001973	-	161046	164	57.5	[43]
	Leucania separata NPV	LeseNPV	NC_008348	AH1	168041	169	48.6	[44]
	Lymantria xyliana MNPV	LyxyMNPV	NC_013953	LyxyMNPV-5	156344	157	53.5	[45]
	Mamestra brassicae MNPV	MbMNPV	NC_023681	K1	152710	159	39.9	[46]
	Mamestra configurata NPV-A	MacoNPV-A	NC_003529	A	155060	169	41.7	[47]
	Mamestra configurata NPV-B	MacoNPV-B	NC_004117	B	158482	168	40	[48]
	Malacosoma Neustria NPV	ManeNPV	KY968317	ManeNPV-T2	130202	131	38.2	[49]
	Mythimna unipuncta NPV-A	MyunNPV-A	NC_043530	#7	148482	159	48.6	[50]
	Mythimna unipuncta NPV-B	MyunNPV-B	MH124167	KY310	156647	152	43.9	[51]
	Operophtera brumata NPV	OpbuNPV	MF614691	OpbuNPV-MA	119054	130	39.8	[52]
	Orgyia leucostigma NPV	OrleNPV	NC_010276	CFS-77	156179	135	39.9	[53]
	Perigonia lusca SNP	PeluSNPV	NC_027923	-	132831	145	40	[54]
	Peridroma NPV	PespNPV	NC_024625	GR_167	151109	139	53.2	[55]
	Pseudoplusia includens SNP	PsinSNPV	NC_026268	IE	139132	141	39.3	[56]
	Spodoptera exigua MNPV	SeMNPV-QD	MH370144	QD	128525	127	37.4	[57]
	Spodoptera exigua MNPV	SeMNPV	NC_002169	US1	135611	139	43.8	[58]
	Spodoptera frugiperda MNPV	SfMNPV	NC_009011	3AP2	131331	143	40.2	[59]
	Spodoptera eridania NPV	SperNPV	MH320559	251	149090	146	45	[60]

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<i>Betabaculovirus</i>	Spodoptera exempta NPV	SpexNPV	MH717816	244.1	129528	139	41.2	-
	Spodoptera littoralis NPV	SpliNPV	JX454574	AN1956	137998	132	44.7	[61]
	Spodoptera litura NPV	SpltNPV	NC_003102	G2	139342	141	42.8	[62]
	Spodoptera litura NPV II	SpltNPV-II	NC_011616	II	148634	147	45	-
	Sucra jujuba NPV	SujuNPV	KJ676450	473	135952	131	38.7	[63]
	Trichoplusia ni SNP	TnSNP	NC_007383	-	134394	145	39	[64]
	Urbanus proteus NPV	UrprNPV	NC_029997	Southern Brazil	105555	119	34.7	[65]
	Adoxophyes orana GV	AdorGV	NC_005038	-	99657	119	34.5	[66]
	Agrotis segetum GV	AgseGV	NC_039213	DA	131557	152	37	[67]
	Choristoneura occidentalis GV	ChocGV	NC_008168	-	104710	116	32.7	[68]
	Clostera anachoreta GV	ClanGV	NC_015398	ClanGV-HBH N	101487	123	44.4	[69]
	Clostera anastomosis GV	ClasGV-A	NC_022646	HENAN	101818	122	46.7	[70]
	Clostera anastomosis GV-B	ClasGV-B	KR091910	ClasGV-B	107439	123	37.8	[71]
	Cnaphalocrocis medinalis GV	CnmeGV	NC_029304	Enping	111246	118	35.2	[72]
	Cydia pomonella GV	CpGV	NC_002816	Mexican 1	123500	143	45.3	[73]
	Cryptophlebia leucotreta GV	CrleGV	NC_005068	CV3	110907	128	32.4	[74]
	Diatraea saccharalis GV	DisaGV	NC_028491	Parana-2009	98392	125	35	[75]
	Epinotia aporema GV	EpapGV	NC_018875	-	119082	132	41.5	[76]
	Erinnyis ello GV	ErelGV	NC_025257	S86	102759	130	38.7	[77]
	Helicoverpa armigera GV	HearGV	NC_010240	-	169794	179	40.8	[78]
	Hyphantria cunea GV	HycuGV	MH923363	Hc1	114825	132	39.3	[79]
	Mocis latipes GV	MolaGV	KR011718	Southern Brazil	134272	145	38.1	-
	Mythimna unipuncta GV	MyunGV	NC_033780	MyunGV#8	144673	153	49.9	[80]

Genus	Virus <sup>a</sup>	Abbreviation	Accession no.	Strain/isolate	Length(bp)	ORFs	G + C (%)	Reference
Gamma baculovirus	Phthorimaea operculella GV	PhopGV	NC_004062	-	119217	130	35.7	[81]
	Plodia interpunctella GV	PiGV	NC_032255	Cambridge	112536	123	44.1	[82]
	Plutella xylostella GV	PlxyGV	NC_002593	K1	100999	120	40.7	[83]
	Pieris rapae GV	PiraGV	NC_013797	Wuhan	108592	120	33.2	[84]
	Pseudaletia unipuncta GV	PsunGV	NC_013772	Hawaiin	176677	183	39.8	-
	Spodoptera frugiperda GV	SpfrGV	NC_026511	VG008	140913	146	46.2	[85]
	Spodoptera litura GV	SpltGV	NC_009503	SIGV-K1	124121	136	38.8	[86]
	Trichoplusia ni GV	TnGV	KU752557	LBIV-12	175360	172	39.7	[87]
	Xestia c-nigrum GV	XecnGV	NC_002331	-	178733	181	40.7	[88]
	Neodiprion abietis NPV	NeabNPV	NC_008252	-	84264	93	33.4	[89]
	Neodiprion lecontei NPV	NeleNPV	NC_005906	-	81755	89	33.3	[90]
	Neodiprion sertifer NPV	NeseNPV	NC_005905	-	86462	90	33.8	[91]
Delta baculovirus	Culex nigripalpus NPV	CuniNPV	NC_003084	Florida1997	108252	109	50.9	[92]

<sup>a</sup> EranNPV is not shown.

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