

1: Bowden_23	3	5	1	10	15	18		33	45	51	55	60	66		91	98		109	112	124		131	148	157	165	170	174	186	188	196	205		218	224	231	
2: GirlDinner_22	3	5	1	10	15	18		33	45	51	55	60	66	69		91	98		109	112	124		131	148	157	165	170	174	186	188	196	205		218	224	231
3: Nishikiori_22	3	5	1	10	15	18		33	45	51	55	60	66	69		91	98		109	112	124		131	148	157	165	170	174	186	188	196	205		218	224	231
4: Marav_25	3	5	1	9	12		24	34	42	52	55	63	69		92	98		109	114	122		132	143	148	155	164	176	182	188	194	200	205	216	222	233	
5: Diane_22	3	5	1	9	12		24	34	42	52	55	63	69		92	98		109	114	122		132	143	148	155	164	176	182	188	194	200	205	216	222	233	
6: Paolo_24	3	5	1	10	19				44	51	55	65	69		92	98		109	114	124		132	146	151	164	170	176	182	188	194	200	205	216	222	233	
7: Puginator_24	3	5	1	10	19				44	51	55	65	69		92	98		109	114	124		132	146	151	164	170	176	182	188	194	200	205	216	222	233	
8: Amethyst_22	3	5	1	10	19		26	30	40	51	55	61	69		93	94		109	114	125	127	132	146	151	164	170	176	182	188	194	200	205	216	222	233	
9: Dauda_22	3	5	1	11	19		33		48	51	55	66			93	94		109	114	123	127	139	148	151	164	173	175	183	188	194	200	205	216	222	233	
10: Andre_22	3	5	1	11	19		33		48	51	55	66	69		93	94		109	114	123	127	139	148	151	164	173	175	183	188	194	200	205	216	222	233	
11: Haizum_22	3	5	1	11	19		33		48	51	55	66	69		93	94		109	114	123	127	139	148	151	164	173	175	183	188	194	200	205	216	222	233	
12: Superstar_25	3	5	1	11	19		33		48	51	55	66	69		93	94		109	114	123	127	139	148	151	164	173	175	183	188	194	200	205	216	222	233	
13: Axiom_26	3	5	1	10	18	21		33	45	51	55	60	66		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
14: Pablo_22	3	5	1	11	14	19		33	46	51	55	66			93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
15: Paedre_22	3	5	1	11	14	19		33	46	51	55	66			93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
16: Caelum_23	3	5	1	10	18		35	44	51	55	66	69			93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
17: Jevington_24	3	5	1	10	18		35	44	51	55	66	69			93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
18: ELB20_21 +	3	5	1	11	14	19		33	46	51	55	66			93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
19: Lootan_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
20: Animis_23	3	5	1	11	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
21: BartholomewSt_24#1	3	5	1	11	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
22: Issmi_23	3	5	1	11	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
23: TrvxScott_21	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
24: Hank_44_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
25: Omar_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
26: SqueakyClean_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
27: Janus_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
28: Tetunt_22	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
29: Thestral_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
30: Zaino_24	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
31: Triumph_24	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
32: Vanseggelen_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
33: Dexters_21	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
34: Yosif_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
35: Conan_23 +	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
36: Verse_22	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
37: Amela_22	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
38: SunkenRoot_22	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
39: Alisaber_23 + 2	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
40: phiCAM_23	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		
41: Celery_25	3	5	1	10	15	18		33	46	51	55	66	69		93	98	101	109		125		139	148	151	164	170	178	186	192	198	205	216	222	233		

Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

Pham 328895 Report

This analysis was run 09/05/26 on database version 662.

Pham number 328895 has 47 members, 4 are drafts.

Phages represented in each track:

- Track 1 : Bowden_23, TinaBelcher_22
- Track 2 : GirlDinner_22
- Track 3 : Nishikigoi_22
- Track 4 : Marav_25
- Track 5 : Diane_22
- Track 6 : Paolo_24
- Track 7 : Puginator_24
- Track 8 : Amethyst_22
- Track 9 : Daudau_22
- Track 10 : Andris_22
- Track 11 : Haizum_22
- Track 12 : Superstar_25
- Track 13 : Axiom_23
- Track 14 : Pablito_22
- Track 15 : Paedore_22
- Track 16 : Caelum_23
- Track 17 : Jevington_24
- Track 18 : ELB20_21, R4_22
- Track 19 : Loofah_23
- Track 20 : Animus_23
- Track 21 : BartholomewSD_24, Alvy_24
- Track 22 : Issmi_23
- Track 23 : TrvxScott_21
- Track 24 : Hank144_23
- Track 25 : Omar_23
- Track 26 : SqueakyClean_23
- Track 27 : Janus_23
- Track 28 : Tefunt_22
- Track 29 : Thestral_23
- Track 30 : Zainub_24
- Track 31 : Triumph_24
- Track 32 : Vanseggelen_27
- Track 33 : Dexers_21
- Track 34 : Yosif_23
- Track 35 : Conan_23, Pavo_23
- Track 36 : Verse_22
- Track 37 : Amela_22

- Track 38 : SunkenRoot_22
- Track 39 : Alsaber_23, Sudan_22, Kaine_22
- Track 40 : phiCAM_23
- Track 41 : Celery_25

Summary of Final Annotations (See graph section above for start numbers):

The start number called the most often in the published annotations is 3, it was called in 21 of the 43 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Alvy_24, Andris_22, Axiom_23, BartholomewSD_24, Bowden_23, Daudau_22, ELB20_21, Hank144_23, Jevington_24, Loofah_23, Marav_25, Pablito_22, Paedore_22, Paolo_24, Puginator_24, R4_22, Thestral_23, TinaBelcher_22, Triumph_24, TrvxScott_21, Zainub_24,

Genes that have the "Most Annotated" start but do not call it:

-

Genes that do not have the "Most Annotated" start:

- Alsaber_23, Amela_22, Amethyst_22, Animus_23, Caelum_23, Celery_25, Conan_23, Dexers_21, Diane_22, GirlDinner_22, Haizum_22, Issmi_23, Janus_23, Kaine_22, Nishikigoi_22, Omar_23, Pavo_23, SqueakyClean_23, Sudan_22, SunkenRoot_22, Superstar_25, Tefunt_22, Vanseggelen_27, Verse_22, Yosif_23, phiCAM_23,

Summary by start number:

Start 3:

- Found in 21 of 47 (44.7%) of genes in pham
- Manual Annotations of this start: 21 of 43
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Alvy_24 (BD2), Andris_22 (BD2), Axiom_23 (BD2), BartholomewSD_24 (BD2), Bowden_23 (BD2), Daudau_22 (BD2), ELB20_21 (BD2), Hank144_23 (BD2), Jevington_24 (BD2), Loofah_23 (BD2), Marav_25 (BD2), Pablito_22 (BD2), Paedore_22 (BD2), Paolo_24 (BD2), Puginator_24 (BD2), R4_22 (BD2), Thestral_23 (BD2), TinaBelcher_22 (BD2), Triumph_24 (BD2), TrvxScott_21 (BD2), Zainub_24 (BD2),

Start 4:

- Found in 4 of 47 (8.5%) of genes in pham
- Manual Annotations of this start: 4 of 43
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Animus_23 (BD2), GirlDinner_22 (BD2), Janus_23 (BD2), SqueakyClean_23 (BD2),

Start 12:

- Found in 15 of 47 (31.9%) of genes in pham
- Manual Annotations of this start: 12 of 43
- Called 100.0% of time when present

- Phage (with cluster) where this start called: Alsaber_23 (BD3), Amela_22 (BD3), Celery_25 (BD3), Conan_23 (BD3), Dexers_21 (BD3), Diane_22 (BD2), Issmi_23 (BD2), Kaine_22 (BD3), Pavo_23 (BD3), Sudan_22 (BD3), SunkenRoot_22 (BD3), Vanseggelen_27 (BD3), Verse_22 (BD3), Yosif_23 (BD3), phiCAM_23 (BD3),

Start 38:

- Found in 7 of 47 (14.9%) of genes in pham
- Manual Annotations of this start: 4 of 43
- Called 57.1% of time when present
- Phage (with cluster) where this start called: Amethyst_22 (BD2), Haizum_22 (BD2), Nishikigoi_22 (BD2), Omar_23 (BD2),

Start 40:

- Found in 5 of 47 (10.6%) of genes in pham
- Manual Annotations of this start: 1 of 43
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Tefunt_22 (BD2),

Start 41:

- Found in 2 of 47 (4.3%) of genes in pham
- Manual Annotations of this start: 1 of 43
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Caelum_23 (BD2), Superstar_25 (BD2),

Summary by clusters:

There are 2 clusters represented in this pham: BD3, BD2,

Info for manual annotations of cluster BD2:

- Start number 3 was manually annotated 21 times for cluster BD2.
- Start number 4 was manually annotated 4 times for cluster BD2.
- Start number 12 was manually annotated 2 times for cluster BD2.
- Start number 38 was manually annotated 4 times for cluster BD2.
- Start number 40 was manually annotated 1 time for cluster BD2.
- Start number 41 was manually annotated 1 time for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 12 was manually annotated 10 times for cluster BD3.

Gene Information:

Gene: Alsaber_23 Start: 18064, Stop: 19866, Start Num: 12

Candidate Starts for Alsaber_23:

(9, 18025), (Start: 12 @18064 has 12 MA's), (13, 18076), (23, 18172), (25, 18214), (31, 18274), (44, 18373), (66, 18589), (128, 18904), (130, 18925), (137, 18949), (142, 18982), (154, 19069), (161, 19126), (179, 19279), (186, 19327), (189, 19360), (196, 19414), (225, 19696), (229, 19738), (233, 19771),

Gene: Alvy_24 Start: 17376, Stop: 19559, Start Num: 3

Candidate Starts for Alvy_24:

(Start: 3 @17376 has 21 MA's), (5, 17412), (11, 17529), (16, 17610), (17, 17622), (33, 17811), (45, 17904), (51, 17970), (55, 18012), (60, 18045), (66, 18111), (90, 18297), (91, 18309), (98, 18360), (99, 18363), (107, 18453), (114, 18504), (129, 18618), (145, 18717), (148, 18744), (157, 18804), (166, 18858), (170, 18879), (171, 18882), (178, 18969), (189, 19059), (191, 19068), (195, 19104), (196, 19113), (200, 19149), (205, 19227), (221, 19353), (222, 19362), (230, 19443), (231, 19452),

Gene: Amela_22 Start: 18357, Stop: 20531, Start Num: 12

Candidate Starts for Amela_22:

(9, 18318), (Start: 12 @18357 has 12 MA's), (23, 18465), (25, 18507), (47, 18693), (64, 18912), (68, 18990), (70, 19011), (71, 19014), (78, 19122), (80, 19137), (92, 19245), (96, 19269), (100, 19311), (104, 19338), (106, 19365), (128, 19563), (135, 19602), (141, 19635), (149, 19689), (161, 19785), (196, 20073), (218, 20292), (225, 20355), (229, 20397), (233, 20436),

Gene: Amethyst_22 Start: 17833, Stop: 19476, Start Num: 38

Candidate Starts for Amethyst_22:

(Start: 38 @17833 has 4 MA's), (Start: 40 @17845 has 1 MA's), (53, 17953), (55, 17974), (69, 18094), (112, 18445), (114, 18466), (128, 18514), (137, 18559), (142, 18592), (143, 18595), (161, 18736), (164, 18757), (168, 18781), (176, 18853), (180, 18895), (182, 18904), (188, 18970), (200, 19063), (214, 19219), (225, 19306), (233, 19381),

Gene: Andris_22 Start: 17081, Stop: 19264, Start Num: 3

Candidate Starts for Andris_22:

(Start: 3 @17081 has 21 MA's), (7, 17180), (10, 17216), (11, 17234), (33, 17516), (48, 17645), (51, 17675), (55, 17717), (66, 17822), (92, 18023), (93, 18026), (102, 18101), (123, 18260), (139, 18377), (148, 18434), (154, 18485), (157, 18512), (168, 18587), (172, 18617), (173, 18641), (190, 18773), (194, 18797), (195, 18812), (198, 18839), (205, 18935), (206, 18953), (209, 18992), (219, 19049), (222, 19070), (227, 19109), (229, 19142), (230, 19151), (241, 19250),

Gene: Animus_23 Start: 17417, Stop: 19603, Start Num: 4

Candidate Starts for Animus_23:

(Start: 4 @17417 has 4 MA's), (7, 17513), (10, 17549), (15, 17615), (18, 17672), (33, 17849), (51, 18008), (55, 18050), (69, 18164), (91, 18347), (98, 18398), (109, 18500), (124, 18605), (139, 18710), (144, 18737), (148, 18767), (170, 18920), (174, 18971), (195, 19145), (198, 19172), (200, 19190), (205, 19268), (211, 19337), (219, 19382), (224, 19424), (229, 19478),

Gene: Axiom_23 Start: 17230, Stop: 19440, Start Num: 3

Candidate Starts for Axiom_23:

(Start: 3 @17230 has 21 MA's), (6, 17284), (7, 17329), (10, 17365), (11, 17383), (33, 17665), (45, 17758), (51, 17824), (53, 17845), (56, 17875), (60, 17899), (61, 17908), (66, 17965), (91, 18163), (98, 18214), (109, 18316), (131, 18499), (132, 18502), (133, 18508), (134, 18517), (135, 18523), (155, 18655), (158, 18697), (175, 18817), (178, 18853), (186, 18910), (189, 18943), (190, 18949), (194, 18973), (195, 18988), (198, 19015), (205, 19111), (206, 19129), (207, 19138), (209, 19168), (211, 19180), (219, 19225), (222, 19246), (226, 19282), (227, 19285), (229, 19318), (230, 19327), (241, 19426),

Gene: BartholomewSD_24 Start: 17376, Stop: 19559, Start Num: 3

Candidate Starts for BartholomewSD_24:

(Start: 3 @17376 has 21 MA's), (5, 17412), (11, 17529), (16, 17610), (17, 17622), (33, 17811), (45, 17904), (51, 17970), (55, 18012), (60, 18045), (66, 18111), (90, 18297), (91, 18309), (98, 18360), (99, 18363), (107, 18453), (114, 18504), (129, 18618), (145, 18717), (148, 18744), (157, 18804), (166, 18858), (170, 18879), (171, 18882), (178, 18969), (189, 19059), (191, 19068), (195, 19104), (196, 19113), (200, 19149), (205, 19227), (221, 19353), (222, 19362), (230, 19443), (231, 19452),

Gene: Bowden_23 Start: 17308, Stop: 19491, Start Num: 3

Candidate Starts for Bowden_23:

(Start: 3 @17308 has 21 MA's), (5, 17344), (7, 17407), (10, 17443), (11, 17461), (16, 17542), (17, 17554), (33, 17743), (45, 17836), (51, 17902), (55, 17944), (60, 17977), (66, 18043), (90, 18229), (91, 18241), (98, 18292), (148, 18676), (157, 18736), (165, 18781), (166, 18790), (170, 18811), (171, 18814), (189, 18991), (191, 19000), (193, 19009), (195, 19036), (196, 19045), (205, 19159), (222, 19294), (231, 19384),

Gene: Caelum_23 Start: 17860, Stop: 19602, Start Num: 41

Candidate Starts for Caelum_23:

(Start: 41 @17860 has 1 MA's), (43, 17872), (53, 17980), (55, 18001), (66, 18106), (125, 18571), (138, 18655), (147, 18712), (157, 18799), (161, 18829), (183, 18997), (184, 19000), (189, 19063), (201, 19162), (208, 19315), (212, 19342), (217, 19372), (222, 19405), (235, 19525), (240, 19582), (241, 19588),

Gene: Celery_25 Start: 18018, Stop: 19919, Start Num: 12

Candidate Starts for Celery_25:

(Start: 12 @18018 has 12 MA's), (25, 18168), (44, 18327), (78, 18528), (85, 18576), (104, 18744), (117, 18855), (118, 18864), (128, 18960), (137, 19005), (141, 19032), (143, 19041), (149, 19086), (161, 19182), (196, 19470), (213, 19662), (215, 19668), (225, 19749),

Gene: Conan_23 Start: 17786, Stop: 19858, Start Num: 12

Candidate Starts for Conan_23:

(9, 17747), (Start: 12 @17786 has 12 MA's), (25, 17936), (47, 18122), (54, 18212), (67, 18332), (73, 18362), (79, 18461), (80, 18467), (85, 18500), (92, 18575), (100, 18641), (104, 18668), (118, 18794), (128, 18890), (135, 18929), (137, 18935), (141, 18962), (149, 19016), (161, 19112), (168, 19157), (175, 19223), (189, 19346), (196, 19400), (218, 19619), (225, 19682), (229, 19724), (233, 19763),

Gene: Daudau_22 Start: 17288, Stop: 19480, Start Num: 3

Candidate Starts for Daudau_22:

(Start: 3 @17288 has 21 MA's), (7, 17387), (10, 17423), (19, 17561), (20, 17567), (26, 17657), (30, 17705), (51, 17882), (55, 17924), (83, 18134), (94, 18233), (109, 18371), (110, 18380), (125, 18494), (127, 18524), (166, 18776), (170, 18797), (194, 19007), (195, 19022), (198, 19049), (205, 19145), (206, 19163), (219, 19259), (224, 19301), (229, 19355), (241, 19466),

Gene: Dexers_21 Start: 17767, Stop: 19797, Start Num: 12

Candidate Starts for Dexers_21:

(9, 17728), (Start: 12 @17767 has 12 MA's), (13, 17779), (23, 17875), (25, 17917), (31, 17977), (Start: 38 @18031 has 4 MA's), (44, 18076), (75, 18358), (77, 18409), (103, 18622), (118, 18751), (120, 18772), (121, 18775), (128, 18835), (135, 18874), (137, 18880), (141, 18907), (143, 18916), (161, 19057), (179, 19210), (196, 19345), (205, 19459), (225, 19627), (229, 19669), (233, 19702),

Gene: Diane_22 Start: 17826, Stop: 19859, Start Num: 12

Candidate Starts for Diane_22:

(9, 17787), (Start: 12 @17826 has 12 MA's), (24, 17994), (42, 18153), (52, 18258), (63, 18348), (69, 18414), (82, 18507), (88, 18555), (114, 18783), (122, 18834), (128, 18897), (142, 18975), (143, 18978), (161, 19119), (164, 19140), (176, 19236), (180, 19278), (182, 19287), (187, 19332), (188, 19353), (194, 19386), (200, 19446), (214, 19602), (225, 19689), (233, 19764),

Gene: ELB20_21 Start: 17412, Stop: 19601, Start Num: 3

Candidate Starts for ELB20_21:

(Start: 3 @17412 has 21 MA's), (8, 17535), (29, 17826), (33, 17847), (51, 18006), (61, 18093), (63, 18099), (83, 18273), (120, 18594), (147, 18765), (166, 18906), (170, 18927), (195, 19152), (200,

19197), (203, 19227), (205, 19275), (227, 19449), (228, 19470), (231, 19500),

Gene: GirlDinner_22 Start: 17079, Stop: 19265, Start Num: 4

Candidate Starts for GirlDinner_22:

(Start: 4 @17079 has 4 MA's), (7, 17175), (10, 17211), (15, 17277), (18, 17334), (33, 17511), (51, 17670), (55, 17712), (69, 17826), (91, 18009), (98, 18060), (109, 18162), (124, 18267), (139, 18372), (144, 18399), (148, 18429), (170, 18582), (174, 18633), (186, 18729), (194, 18792), (195, 18807), (198, 18834), (200, 18852), (205, 18930), (219, 19044), (224, 19086), (229, 19140), (238, 19215),

Gene: Haizum_22 Start: 17858, Stop: 19498, Start Num: 38

Candidate Starts for Haizum_22:

(Start: 38 @17858 has 4 MA's), (Start: 40 @17870 has 1 MA's), (53, 17978), (55, 17999), (63, 18053), (66, 18104), (69, 18119), (112, 18467), (114, 18488), (128, 18536), (137, 18581), (142, 18614), (143, 18617), (161, 18758), (164, 18779), (176, 18875), (180, 18917), (182, 18926), (187, 18971), (188, 18992), (200, 19085), (214, 19241), (217, 19262), (225, 19328), (233, 19403),

Gene: Hank144_23 Start: 17474, Stop: 19687, Start Num: 3

Candidate Starts for Hank144_23:

(Start: 3 @17474 has 21 MA's), (10, 17609), (15, 17675), (18, 17732), (33, 17909), (51, 18068), (55, 18110), (57, 18125), (58, 18140), (61, 18152), (83, 18320), (87, 18359), (89, 18386), (109, 18557), (110, 18566), (132, 18743), (155, 18896), (161, 18950), (163, 18962), (169, 18995), (170, 19001), (188, 19181), (209, 19409), (211, 19421), (216, 19445), (225, 19517),

Gene: Issmi_23 Start: 18292, Stop: 20220, Start Num: 12

Candidate Starts for Issmi_23:

(Start: 12 @18292 has 12 MA's), (39, 18607), (42, 18619), (49, 18685), (54, 18748), (61, 18808), (126, 19330), (132, 19390), (133, 19396), (134, 19405), (135, 19411), (136, 19414), (147, 19480), (181, 19648), (195, 19759), (198, 19786), (202, 19813), (206, 19900), (217, 19984), (220, 20005), (224, 20038), (229, 20092),

Gene: Janus_23 Start: 17417, Stop: 19603, Start Num: 4

Candidate Starts for Janus_23:

(Start: 4 @17417 has 4 MA's), (7, 17513), (10, 17549), (15, 17615), (18, 17672), (33, 17849), (51, 18008), (55, 18050), (60, 18083), (69, 18164), (77, 18221), (91, 18347), (98, 18398), (109, 18500), (124, 18605), (139, 18710), (144, 18737), (148, 18767), (170, 18920), (174, 18971), (186, 19067), (194, 19130), (195, 19145), (198, 19172), (200, 19190), (205, 19268), (219, 19382), (224, 19424), (229, 19478), (238, 19553),

Gene: Jevington_24 Start: 17726, Stop: 19936, Start Num: 3

Candidate Starts for Jevington_24:

(Start: 3 @17726 has 21 MA's), (7, 17825), (10, 17861), (18, 17984), (19, 17999), (35, 18179), (44, 18251), (51, 18320), (56, 18371), (69, 18476), (109, 18815), (110, 18824), (161, 19208), (163, 19220), (170, 19259), (189, 19442), (191, 19451), (193, 19460), (195, 19487), (196, 19496), (199, 19520), (205, 19610), (221, 19736), (222, 19745),

Gene: Kaine_22 Start: 17767, Stop: 19569, Start Num: 12

Candidate Starts for Kaine_22:

(9, 17728), (Start: 12 @17767 has 12 MA's), (13, 17779), (23, 17875), (25, 17917), (31, 17977), (44, 18076), (66, 18292), (128, 18607), (130, 18628), (137, 18652), (142, 18685), (154, 18772), (161, 18829), (179, 18982), (186, 19030), (189, 19063), (196, 19117), (225, 19399), (229, 19441), (233, 19474),

Gene: Loofah_23 Start: 17341, Stop: 19530, Start Num: 3

Candidate Starts for Loofah_23:

(Start: 3 @17341 has 21 MA's), (11, 17494), (14, 17536), (19, 17614), (33, 17776), (46, 17875), (50, 17914), (51, 17935), (61, 18022), (63, 18028), (83, 18202), (139, 18649), (166, 18835), (177, 18919), (185, 18976), (200, 19123), (210, 19264), (216, 19294), (220, 19321), (225, 19366), (231, 19426),

Gene: Marav_25 Start: 18076, Stop: 20283, Start Num: 3

Candidate Starts for Marav_25:

(Start: 3 @18076 has 21 MA's), (5, 18112), (7, 18175), (10, 18211), (19, 18349), (44, 18601), (51, 18670), (61, 18754), (87, 18961), (89, 18988), (109, 19162), (110, 19171), (113, 19186), (155, 19501), (159, 19546), (161, 19555), (163, 19567), (189, 19789), (191, 19798), (192, 19804), (195, 19834), (196, 19843), (205, 19957), (216, 20053), (222, 20092),

Gene: Nishikigoi_22 Start: 17858, Stop: 19498, Start Num: 38

Candidate Starts for Nishikigoi_22:

(Start: 38 @17858 has 4 MA's), (Start: 40 @17870 has 1 MA's), (53, 17978), (55, 17999), (63, 18053), (66, 18104), (69, 18119), (112, 18467), (114, 18488), (128, 18536), (137, 18581), (142, 18614), (143, 18617), (161, 18758), (164, 18779), (176, 18875), (180, 18917), (182, 18926), (187, 18971), (188, 18992), (200, 19085), (225, 19328), (233, 19403),

Gene: Omar_23 Start: 18196, Stop: 19896, Start Num: 38

Candidate Starts for Omar_23:

(Start: 38 @18196 has 4 MA's), (Start: 40 @18208 has 1 MA's), (56, 18337), (66, 18433), (97, 18676), (100, 18700), (105, 18739), (107, 18769), (109, 18778), (126, 18904), (128, 18934), (135, 18973), (143, 19015), (161, 19156), (180, 19315), (188, 19390), (190, 19399), (194, 19423), (197, 19450), (200, 19483), (204, 19537), (214, 19639), (219, 19672), (225, 19726), (232, 19789),

Gene: Pablito_22 Start: 17181, Stop: 19376, Start Num: 3

Candidate Starts for Pablito_22:

(Start: 3 @17181 has 21 MA's), (7, 17280), (10, 17316), (18, 17439), (19, 17454), (21, 17469), (45, 17709), (51, 17775), (86, 18060), (101, 18195), (109, 18270), (139, 18480), (144, 18507), (148, 18537), (156, 18606), (160, 18639), (166, 18678), (170, 18699), (178, 18789), (186, 18846), (195, 18924), (198, 18951), (205, 19047), (219, 19161), (222, 19182), (227, 19221), (229, 19254), (230, 19263),

Gene: Paedore_22 Start: 17341, Stop: 19530, Start Num: 3

Candidate Starts for Paedore_22:

(Start: 3 @17341 has 21 MA's), (11, 17494), (14, 17536), (19, 17614), (33, 17776), (46, 17875), (50, 17914), (51, 17935), (61, 18022), (63, 18028), (83, 18202), (139, 18649), (166, 18835), (170, 18856), (177, 18919), (185, 18976), (200, 19123), (210, 19264), (216, 19294), (220, 19321), (225, 19366), (231, 19426),

Gene: Paolo_24 Start: 17738, Stop: 19948, Start Num: 3

Candidate Starts for Paolo_24:

(Start: 3 @17738 has 21 MA's), (5, 17774), (7, 17837), (26, 18107), (34, 18179), (51, 18332), (55, 18374), (60, 18407), (66, 18473), (90, 18659), (91, 18671), (109, 18827), (132, 19013), (133, 19019), (147, 19103), (155, 19166), (161, 19220), (163, 19232), (189, 19454), (191, 19463), (195, 19499), (196, 19508), (205, 19622), (206, 19640), (216, 19718), (222, 19757),

Gene: Pavo_23 Start: 18059, Stop: 20131, Start Num: 12

Candidate Starts for Pavo_23:

(9, 18020), (Start: 12 @18059 has 12 MA's), (25, 18209), (47, 18395), (54, 18485), (67, 18605), (73, 18635), (79, 18734), (80, 18740), (85, 18773), (92, 18848), (100, 18914), (104, 18941), (118, 19067), (128, 19163), (135, 19202), (137, 19208), (141, 19235), (149, 19289), (161, 19385), (168, 19430),

(175, 19496), (189, 19619), (196, 19673), (218, 19892), (225, 19955), (229, 19997), (233, 20036),

Gene: Puginator_24 Start: 17783, Stop: 19963, Start Num: 3

Candidate Starts for Puginator_24:

(Start: 3 @17783 has 21 MA's), (7, 17882), (10, 17918), (19, 18056), (44, 18308), (51, 18377), (65, 18500), (92, 18725), (124, 18974), (136, 19079), (140, 19106), (146, 19136), (151, 19181), (161, 19238), (162, 19244), (170, 19289), (189, 19469), (191, 19478), (195, 19514), (196, 19523), (205, 19637), (216, 19733), (221, 19763), (222, 19772),

Gene: R4_22 Start: 17423, Stop: 19612, Start Num: 3

Candidate Starts for R4_22:

(Start: 3 @17423 has 21 MA's), (8, 17546), (29, 17837), (33, 17858), (51, 18017), (61, 18104), (63, 18110), (83, 18284), (120, 18605), (147, 18776), (166, 18917), (170, 18938), (195, 19163), (200, 19208), (203, 19238), (205, 19286), (227, 19460), (228, 19481), (231, 19511),

Gene: SqueakyClean_23 Start: 17343, Stop: 19529, Start Num: 4

Candidate Starts for SqueakyClean_23:

(Start: 4 @17343 has 4 MA's), (7, 17439), (10, 17475), (15, 17541), (18, 17598), (33, 17775), (51, 17934), (55, 17976), (60, 18009), (69, 18090), (91, 18273), (98, 18324), (109, 18426), (124, 18531), (139, 18636), (144, 18663), (148, 18693), (170, 18846), (174, 18897), (195, 19071), (198, 19098), (200, 19116), (205, 19194), (211, 19263), (217, 19296), (219, 19308), (229, 19404),

Gene: Sudan_22 Start: 18054, Stop: 19856, Start Num: 12

Candidate Starts for Sudan_22:

(9, 18015), (Start: 12 @18054 has 12 MA's), (13, 18066), (23, 18162), (25, 18204), (31, 18264), (44, 18363), (66, 18579), (128, 18894), (130, 18915), (137, 18939), (142, 18972), (154, 19059), (161, 19116), (179, 19269), (186, 19317), (189, 19350), (196, 19404), (225, 19686), (229, 19728), (233, 19761),

Gene: SunkenRoot_22 Start: 18350, Stop: 20338, Start Num: 12

Candidate Starts for SunkenRoot_22:

(9, 18311), (Start: 12 @18350 has 12 MA's), (25, 18500), (Start: 38 @18614 has 4 MA's), (44, 18659), (54, 18776), (62, 18824), (78, 18935), (80, 18950), (92, 19058), (100, 19124), (104, 19151), (106, 19178), (128, 19376), (130, 19397), (137, 19421), (141, 19448), (149, 19502), (154, 19541), (161, 19598), (164, 19619), (196, 19886), (225, 20168), (242, 20333),

Gene: Superstar_25 Start: 19064, Stop: 20764, Start Num: 41

Candidate Starts for Superstar_25:

(Start: 41 @19064 has 1 MA's), (53, 19184), (55, 19205), (61, 19253), (109, 19655), (111, 19673), (114, 19697), (125, 19775), (150, 19937), (152, 19955), (153, 19964), (156, 19988), (201, 20312), (208, 20465), (212, 20492), (217, 20522), (222, 20555), (223, 20567), (236, 20681), (237, 20696), (240, 20744), (241, 20750),

Gene: Tefunt_22 Start: 17870, Stop: 19501, Start Num: 40

Candidate Starts for Tefunt_22:

(Start: 38 @17858 has 4 MA's), (Start: 40 @17870 has 1 MA's), (53, 17978), (55, 17999), (63, 18053), (66, 18104), (69, 18119), (112, 18470), (114, 18491), (128, 18539), (137, 18584), (142, 18617), (143, 18620), (161, 18761), (164, 18782), (176, 18878), (180, 18920), (182, 18929), (187, 18974), (188, 18995), (200, 19088), (225, 19331), (233, 19406),

Gene: Thestral_23 Start: 17311, Stop: 19494, Start Num: 3

Candidate Starts for Thestral_23:

(Start: 3 @17311 has 21 MA's), (7, 17410), (16, 17545), (17, 17557), (18, 17569), (33, 17746), (45, 17839), (51, 17905), (53, 17926), (60, 17980), (66, 18046), (82, 18157), (90, 18232), (91, 18244), (98, 18295), (99, 18298), (109, 18397), (145, 18652), (148, 18679), (157, 18739), (166, 18793), (170, 18814), (171, 18817), (178, 18904), (189, 18994), (191, 19003), (193, 19012), (195, 19039), (196, 19048), (205, 19162), (221, 19288), (222, 19297), (226, 19333), (231, 19387),

Gene: TinaBelcher_22 Start: 17259, Stop: 19442, Start Num: 3

Candidate Starts for TinaBelcher_22:

(Start: 3 @17259 has 21 MA's), (5, 17295), (7, 17358), (10, 17394), (11, 17412), (16, 17493), (17, 17505), (33, 17694), (45, 17787), (51, 17853), (55, 17895), (60, 17928), (66, 17994), (90, 18180), (91, 18192), (98, 18243), (148, 18627), (157, 18687), (165, 18732), (166, 18741), (170, 18762), (171, 18765), (189, 18942), (191, 18951), (193, 18960), (195, 18987), (196, 18996), (205, 19110), (222, 19245), (231, 19335),

Gene: Triumph_24 Start: 17260, Stop: 19452, Start Num: 3

Candidate Starts for Triumph_24:

(Start: 3 @17260 has 21 MA's), (7, 17359), (10, 17395), (11, 17413), (32, 17692), (33, 17695), (44, 17785), (53, 17875), (60, 17929), (91, 18193), (98, 18244), (109, 18346), (124, 18451), (139, 18556), (156, 18682), (160, 18715), (166, 18754), (170, 18775), (178, 18865), (186, 18922), (189, 18955), (190, 18961), (195, 19000), (198, 19027), (205, 19123), (206, 19141), (209, 19180), (211, 19192), (219, 19237), (222, 19258), (227, 19297), (229, 19330), (230, 19339), (241, 19438),

Gene: TrvxScott_21 Start: 17261, Stop: 19474, Start Num: 3

Candidate Starts for TrvxScott_21:

(Start: 3 @17261 has 21 MA's), (5, 17297), (11, 17414), (16, 17495), (17, 17507), (33, 17696), (45, 17789), (51, 17855), (55, 17897), (60, 17930), (66, 17996), (90, 18182), (91, 18194), (98, 18245), (99, 18248), (109, 18347), (132, 18533), (133, 18539), (134, 18548), (155, 18686), (163, 18752), (165, 18761), (178, 18884), (189, 18974), (191, 18983), (193, 18992), (195, 19019), (196, 19028), (205, 19142), (222, 19277), (231, 19367),

Gene: Vanseggelen_27 Start: 17719, Stop: 19728, Start Num: 12

Candidate Starts for Vanseggelen_27:

(Start: 12 @17719 has 12 MA's), (27, 17896), (47, 18058), (59, 18184), (77, 18316), (79, 18337), (80, 18343), (85, 18376), (95, 18469), (100, 18517), (104, 18544), (128, 18769), (135, 18808), (137, 18814), (141, 18841), (149, 18895), (161, 18991), (164, 19012), (168, 19036), (196, 19279), (213, 19471), (215, 19477), (225, 19558), (234, 19636),

Gene: Verse_22 Start: 18351, Stop: 20525, Start Num: 12

Candidate Starts for Verse_22:

(9, 18312), (Start: 12 @18351 has 12 MA's), (23, 18459), (25, 18501), (47, 18687), (54, 18777), (64, 18906), (68, 18984), (70, 19005), (71, 19008), (78, 19116), (80, 19131), (92, 19239), (96, 19263), (100, 19305), (104, 19332), (106, 19359), (119, 19482), (128, 19557), (135, 19596), (141, 19629), (149, 19683), (161, 19779), (196, 20067), (218, 20286), (225, 20349), (229, 20391), (233, 20430),

Gene: Yosif_23 Start: 18289, Stop: 20154, Start Num: 12

Candidate Starts for Yosif_23:

(Start: 12 @18289 has 12 MA's), (22, 18442), (28, 18550), (36, 18595), (37, 18607), (44, 18661), (78, 18826), (81, 18847), (92, 18949), (94, 18958), (95, 18967), (104, 19042), (113, 19126), (115, 19132), (128, 19180), (137, 19225), (141, 19252), (143, 19261), (149, 19306), (161, 19402), (167, 19444), (176, 19519), (182, 19567), (225, 19972), (230, 20023), (239, 20113),

Gene: Zainub_24 Start: 17696, Stop: 19903, Start Num: 3

Candidate Starts for Zainub_24:

(Start: 3 @17696 has 21 MA's), (5, 17732), (19, 17969), (44, 18221), (51, 18290), (58, 18362), (61, 18374), (83, 18542), (92, 18632), (109, 18782), (110, 18791), (132, 18968), (133, 18974), (155, 19121), (161, 19175), (163, 19187), (170, 19226), (189, 19409), (191, 19418), (195, 19454), (196, 19463), (205, 19577), (206, 19595), (216, 19673), (222, 19712),

Gene: phiCAM_23 Start: 20017, Stop: 21960, Start Num: 12

Candidate Starts for phiCAM_23:

(1, 19699), (2, 19702), (Start: 12 @20017 has 12 MA's), (25, 20167), (44, 20326), (66, 20536), (72, 20545), (74, 20560), (76, 20569), (84, 20659), (98, 20770), (108, 20860), (116, 20902), (125, 20968), (128, 20998), (135, 21037), (137, 21043), (141, 21070), (143, 21079), (149, 21124), (154, 21163), (161, 21220), (164, 21241), (176, 21337), (196, 21508), (204, 21598), (205, 21622), (213, 21700), (225, 21790), (238, 21910), (239, 21919),