





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 294574 Report

This analysis was run 04/18/26 on database version 643.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 294574 has 110 members, 7 are drafts.

Phages represented in each track:

- Track 1 : Katalie\_46, RedBear\_47, South40\_46
- Track 2 : Ozzie\_45, BeardedLady\_46
- Track 3 : Jash\_47, Eddasa\_47, Izzy\_47, BryanRecycles\_47, Rusticus\_47, Oliynyk\_47
- Track 4 : Ejemplo\_45, TuanPN\_45
- Track 5 : Dwayne\_46, Whatever\_46, Emaanora\_49, Triste\_46, Hippo\_46, BarryBee\_49, SarahRose\_46
- Track 6 : Unstoppable\_46, Esperer\_46, Indigo\_45, Phettuccine\_46, Aaronocolus\_46, Bovely\_46, Nerdos\_45, Leviticus\_46
- Track 7 : Maneekul\_46, Yasdnil\_46
- Track 8 : Asten\_46, Werner\_46
- Track 9 : Lika\_46
- Track 10 : Brataylor\_49, Danzina\_48, Zemlya\_48
- Track 11 : Lannister\_48
- Track 12 : Legacy\_45, SunsetPointe\_45, Caliburn\_45, Hydra\_47
- Track 13 : Toma\_46, Dattran\_48, Goby\_46
- Track 14 : Celeste\_47
- Track 15 : OzzyJ\_47
- Track 16 : EnochSoames\_49
- Track 17 : Nanodon\_48
- Track 18 : Chucky\_46
- Track 19 : Nabi\_47, Rana\_47, Lorelei\_47
- Track 20 : Sujidade\_47
- Track 21 : TagePhighter\_48
- Track 22 : Godpower\_47
- Track 23 : Snorlax\_46
- Track 24 : Haizum\_48, Tefunt\_48, Nishikigoi\_48
- Track 25 : Jevington\_49
- Track 26 : Paedore\_47, ELB20\_46, Loofah\_48
- Track 27 : Animus\_46, SqueakyClean\_46, GirlDinner\_46, Janus\_47
- Track 28 : Caelum\_48
- Track 29 : Zainub\_49
- Track 30 : Amethyst\_46

- Track 31 : Issmi\_48
- Track 32 : BartholomewSD\_49, Alvy\_49
- Track 33 : Superstar\_51
- Track 34 : Thestral\_48
- Track 35 : Pablito\_47
- Track 36 : Bowden\_46, TinaBelcher\_46, TrvxScott\_45
- Track 37 : Diane\_46
- Track 38 : Andris\_47
- Track 39 : Hank144\_49
- Track 40 : Marav\_50
- Track 41 : Triumph\_49
- Track 42 : Axiom\_48
- Track 43 : Omar\_49
- Track 44 : Puginator\_49
- Track 45 : R4\_48
- Track 46 : Daudau\_47
- Track 47 : Paolo\_49
- Track 48 : Provolone\_47, Pavo\_47, ElGato\_47
- Track 49 : Verabelle\_50
- Track 50 : Amela\_46, Verse\_46
- Track 51 : SunkenRoot\_47
- Track 52 : Jhitchelle\_45
- Track 53 : ZamZam\_46
- Track 54 : phiCAM\_44
- Track 55 : Sudan\_46, Kaine\_46, Alsaber\_47
- Track 56 : Saftant\_46
- Track 57 : Dexers\_45
- Track 58 : Vanseggelen\_51
- Track 59 : Conan\_47
- Track 60 : Yosif\_49
- Track 61 : Celery\_49
- Track 62 : Speedwell\_51

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

The start number called the most often in the published annotations is 15, it was called in 94 of the 103 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_46, Alsaber\_47, Alvy\_49, Amela\_46, Andris\_47, Animus\_46, Asten\_46, Axiom\_48, BarryBee\_49, BartholomewSD\_49, BeardedLady\_46, Bovely\_46, Bowden\_46, Brataylor\_49, BryanRecycles\_47, Caliburn\_45, Celery\_49, Celeste\_47, Chucky\_46, Conan\_47, Danzina\_48, Dattran\_48, Dexers\_45, Dwayne\_46, ELB20\_46, Eddasa\_47, Ejemplo\_45, ElGato\_47, Emaanora\_49, EnochSoames\_49, Esperer\_46, GirlDinner\_46, Goby\_46, Godpower\_47, Hank144\_49, Hippo\_46, Hydra\_47, Indigo\_45, Izzy\_47, Janus\_47, Jash\_47, Jevington\_49, Jhitchelle\_45, Kaine\_46, Katalie\_46, Lannister\_48, Legacy\_45, Leviticus\_46, Lika\_46, Loofah\_48, Lorelei\_47, Maneekul\_46, Marav\_50, Nabi\_47, Nanodon\_48, Nerdos\_45, Oliynyk\_47, Ozzie\_45, OzzyJ\_47, Pablito\_47, Paedore\_47, Paolo\_49, Pavo\_47, Phettuccine\_46, Provolone\_47, Puginator\_49, R4\_48, Rana\_47,

RedBear\_47, Rusticus\_47, Saftant\_46, SarahRose\_46, Snorlax\_46, South40\_46, Speedwell\_51, SqueakyClean\_46, Sudan\_46, Sujidade\_47, SunkenRoot\_47, SunsetPointe\_45, TagePhighter\_48, Thestral\_48, TinaBelcher\_46, Toma\_46, Triste\_46, Triumph\_49, TrvxScott\_45, TuanPN\_45, Unstoppable\_46, Vanseggelen\_51, Verabelle\_50, Verse\_46, Werner\_46, Whatever\_46, Yasdnil\_46, Yosif\_49, Zainub\_49, ZamZam\_46, Zemlya\_48,

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

- phiCAM\_44,

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

- Amethyst\_46, Caelum\_48, Daudau\_47, Diane\_46, Haizum\_48, Issmi\_48, Nishikigoi\_48, Omar\_49, Superstar\_51, Tefunt\_48,

### Summary by start number:

Start 13:

- Found in 9 of 110 ( 8.2% ) of genes in pham
- Manual Annotations of this start: 8 of 103
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amethyst\_46 (BD2), Caelum\_48 (BD2), Diane\_46 (BD2), Haizum\_48 (BD2), Issmi\_48 (BD2), Nishikigoi\_48 (BD2), Omar\_49 (BD2), Superstar\_51 (BD2), Tefunt\_48 (BD2),

Start 14:

- Found in 1 of 110 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 103
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Daudau\_47 (BD2),

Start 15:

- Found in 100 of 110 ( 90.9% ) of genes in pham
- Manual Annotations of this start: 94 of 103
- Called 99.0% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_46 (BD1), Alsaber\_47 (BD3), Alvy\_49 (BD2), Amela\_46 (BD3), Andris\_47 (BD2), Animus\_46 (BD2), Asten\_46 (BD1), Axiom\_48 (BD2), BarryBee\_49 (BD1), BartholomewSD\_49 (BD2), BeardedLady\_46 (BD1), Bovely\_46 (BD1), Bowden\_46 (BD2), Brataylor\_49 (BD1), BryanRecycles\_47 (BD1), Caliburn\_45 (BD1), Celery\_49 (BD3), Celeste\_47 (BD1), Chucky\_46 (BD1), Conan\_47 (BD3), Danzina\_48 (BD1), Dattran\_48 (BD1), Dexters\_45 (BD3), Dwayne\_46 (BD1), ELB20\_46 (BD2), Eddasa\_47 (BD1), Ejemplo\_45 (BD1), ElGato\_47 (BD3), Emaanora\_49 (BD1), EnochSoames\_49 (BD1), Esperer\_46 (BD1), GirlDinner\_46 (BD2), Goby\_46 (BD1), Godpower\_47 (BD1), Hank144\_49 (BD2), Hippo\_46 (BD1), Hydra\_47 (BD1), Indigo\_45 (BD1), Izzy\_47 (BD1), Janus\_47 (BD2), Jash\_47 (BD1), Jevington\_49 (BD2), Jhitchelle\_45 (BD3), Kaine\_46 (BD3), Katalie\_46 (BD1), Lannister\_48 (BD1), Legacy\_45 (BD1), Leviticus\_46 (BD1), Lika\_46 (BD1), Loofah\_48 (BD2), Lorelei\_47 (BD1), Maneekul\_46 (BD1), Marav\_50 (BD2), Nabi\_47 (BD1), Nanodon\_48 (BD1), Nerdos\_45 (BD1), Oliynyk\_47 (BD1), Ozzie\_45 (BD1), OzzyJ\_47 (BD1), Pablito\_47 (BD2), Paedore\_47 (BD2), Paolo\_49 (BD2), Pavo\_47 (BD3), Phettuccine\_46 (BD1), Provolone\_47 (BD3), Puginator\_49 (BD2), R4\_48 (BD2), Rana\_47 (BD1), RedBear\_47 (BD1), Rusticus\_47 (BD1), Saftant\_46 (BD3), SarahRose\_46 (BD1), Snorlax\_46 (BD1), South40\_46 (BD1), Speedwell\_51 (BD3), SqueakyClean\_46

(BD2), Sudan\_46 (BD3), Sujidade\_47 (BD1), SunkenRoot\_47 (BD3), SunsetPointe\_45 (BD1), TagePhighter\_48 (BD1), Thestral\_48 (BD2), TinaBelcher\_46 (BD2), Toma\_46 (BD1), Triste\_46 (BD1), Triumph\_49 (BD2), TrvxScott\_45 (BD2), TuanPN\_45 (BD1), Unstoppable\_46 (BD1), Vanseggelen\_51 (BD3), Verabelle\_50 (BD3), Verse\_46 (BD3), Werner\_46 (BD1), Whatever\_46 (BD1), Yasdnil\_46 (BD1), Yosif\_49 (BD3), Zainub\_49 (BD2), ZamZam\_46 (BD3), Zemlya\_48 (BD1),

Start 29:

- Found in 39 of 110 ( 35.5% ) of genes in pham
- No Manual Annotations of this start.
- Called 2.6% of time when present
- Phage (with cluster) where this start called: phiCAM\_44 (BD3),

### **Summary by clusters:**

There are 3 clusters represented in this pham: BD1, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 15 was manually annotated 55 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 13 was manually annotated 8 times for cluster BD2.
- Start number 14 was manually annotated 1 time for cluster BD2.
- Start number 15 was manually annotated 24 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 15 was manually annotated 15 times for cluster BD3.

### **Gene Information:**

Gene: Aaronocolus\_46 Start: 31184, Stop: 31561, Start Num: 15

Candidate Starts for Aaronocolus\_46:

(9, 30965), (Start: 15 @31184 has 94 MA's), (29, 31226), (43, 31325), (62, 31475), (65, 31520),

Gene: Alsaber\_47 Start: 32842, Stop: 33240, Start Num: 15

Candidate Starts for Alsaber\_47:

(Start: 15 @32842 has 94 MA's), (17, 32854), (29, 32899), (65, 33196), (69, 33217), (70, 33220), (72, 33232), (73, 33235),

Gene: Alvy\_49 Start: 32707, Stop: 33081, Start Num: 15

Candidate Starts for Alvy\_49:

(8, 32500), (Start: 15 @32707 has 94 MA's), (20, 32731), (60, 32989), (62, 32995), (65, 33040), (68, 33049), (72, 33076),

Gene: Amela\_46 Start: 33640, Stop: 34035, Start Num: 15

Candidate Starts for Amela\_46:

(Start: 15 @33640 has 94 MA's), (19, 33661), (27, 33673), (29, 33697), (49, 33832), (52, 33859), (65, 33994), (67, 34000), (73, 34030),

Gene: Amethyst\_46 Start: 32076, Stop: 32564, Start Num: 13

Candidate Starts for Amethyst\_46:

(7, 31743), (8, 31869), (Start: 13 @32076 has 8 MA's), (29, 32220), (31, 32235), (50, 32370), (62, 32478), (65, 32523), (68, 32532), (72, 32559),

Gene: Andris\_47 Start: 32341, Stop: 32715, Start Num: 15

Candidate Starts for Andris\_47:

(Start: 15 @32341 has 94 MA's), (20, 32365), (62, 32629), (67, 32680), (68, 32683), (72, 32710),

Gene: Animus\_46 Start: 32580, Stop: 32954, Start Num: 15

Candidate Starts for Animus\_46:

(8, 32373), (Start: 15 @32580 has 94 MA's), (20, 32604), (60, 32862), (62, 32868), (67, 32919), (68, 32922), (72, 32949),

Gene: Asten\_46 Start: 31522, Stop: 31890, Start Num: 15

Candidate Starts for Asten\_46:

(Start: 15 @31522 has 94 MA's), (34, 31573), (36, 31582), (44, 31654), (46, 31660), (49, 31678), (52, 31705), (53, 31708), (60, 31789), (68, 31849), (70, 31864), (74, 31882), (75, 31885),

Gene: Axiom\_48 Start: 32527, Stop: 32901, Start Num: 15

Candidate Starts for Axiom\_48:

(Start: 15 @32527 has 94 MA's), (20, 32551), (38, 32617), (39, 32632), (60, 32809), (62, 32815), (67, 32866), (68, 32869), (72, 32896),

Gene: BarryBee\_49 Start: 31532, Stop: 31900, Start Num: 15

Candidate Starts for BarryBee\_49:

(Start: 15 @31532 has 94 MA's), (34, 31583), (36, 31592), (44, 31664), (46, 31670), (49, 31688), (52, 31715), (53, 31718), (58, 31787), (60, 31799), (68, 31859), (70, 31874), (74, 31892), (75, 31895),

Gene: BartholomewSD\_49 Start: 32706, Stop: 33080, Start Num: 15

Candidate Starts for BartholomewSD\_49:

(8, 32499), (Start: 15 @32706 has 94 MA's), (20, 32730), (60, 32988), (62, 32994), (65, 33039), (68, 33048), (72, 33075),

Gene: BeardedLady\_46 Start: 31561, Stop: 31938, Start Num: 15

Candidate Starts for BeardedLady\_46:

(Start: 15 @31561 has 94 MA's), (29, 31603), (37, 31660), (43, 31702), (62, 31852), (65, 31897),

Gene: Bovely\_46 Start: 31190, Stop: 31567, Start Num: 15

Candidate Starts for Bovely\_46:

(9, 30971), (Start: 15 @31190 has 94 MA's), (29, 31232), (43, 31331), (62, 31481), (65, 31526),

Gene: Bowden\_46 Start: 32621, Stop: 32995, Start Num: 15

Candidate Starts for Bowden\_46:

(8, 32414), (Start: 15 @32621 has 94 MA's), (20, 32645), (45, 32771), (62, 32909), (72, 32990),

Gene: Brataylor\_49 Start: 32499, Stop: 32852, Start Num: 15

Candidate Starts for Brataylor\_49:

(Start: 15 @32499 has 94 MA's), (32, 32535), (34, 32544), (36, 32553), (48, 32640), (64, 32775), (65, 32811), (68, 32820), (71, 32841), (72, 32847),

Gene: BryanRecycles\_47 Start: 31500, Stop: 31865, Start Num: 15

Candidate Starts for BryanRecycles\_47:

(1, 30990), (9, 31281), (Start: 15 @31500 has 94 MA's), (34, 31545), (40, 31587), (51, 31671), (52, 31677), (63, 31770), (67, 31818), (68, 31821), (74, 31854), (76, 31860),

Gene: Caelum\_48 Start: 32310, Stop: 32633, Start Num: 13  
Candidate Starts for Caelum\_48:  
(Start: 13 @32310 has 8 MA's), (20, 32361), (60, 32541), (62, 32547), (67, 32598), (68, 32601),

Gene: Caliburn\_45 Start: 31291, Stop: 31668, Start Num: 15  
Candidate Starts for Caliburn\_45:  
(Start: 15 @31291 has 94 MA's), (29, 31333), (43, 31432), (62, 31582), (65, 31627),

Gene: Celery\_49 Start: 32772, Stop: 33206, Start Num: 15  
Candidate Starts for Celery\_49:  
(8, 32556), (9, 32562), (10, 32586), (11, 32688), (Start: 15 @32772 has 94 MA's), (29, 32865), (31, 32880), (54, 33051), (65, 33162), (67, 33168), (69, 33183), (70, 33186), (73, 33201),

Gene: Celeste\_47 Start: 31965, Stop: 32318, Start Num: 15  
Candidate Starts for Celeste\_47:  
(Start: 15 @31965 has 94 MA's), (36, 32019), (43, 32082), (44, 32091), (47, 32103), (48, 32106), (64, 32241), (65, 32277), (68, 32286), (71, 32307), (72, 32313),

Gene: Chucky\_46 Start: 31536, Stop: 31904, Start Num: 15  
Candidate Starts for Chucky\_46:  
(Start: 15 @31536 has 94 MA's), (34, 31587), (36, 31596), (44, 31668), (52, 31719), (53, 31722), (60, 31803), (68, 31863), (70, 31878), (74, 31896), (75, 31899),

Gene: Conan\_47 Start: 32736, Stop: 33119, Start Num: 15  
Candidate Starts for Conan\_47:  
(11, 32652), (Start: 15 @32736 has 94 MA's), (29, 32778), (30, 32790), (33, 32805), (54, 32964), (65, 33075), (73, 33114),

Gene: Danzina\_48 Start: 32263, Stop: 32616, Start Num: 15  
Candidate Starts for Danzina\_48:  
(Start: 15 @32263 has 94 MA's), (32, 32299), (34, 32308), (36, 32317), (48, 32404), (64, 32539), (65, 32575), (68, 32584), (71, 32605), (72, 32611),

Gene: Dattran\_48 Start: 32114, Stop: 32485, Start Num: 15  
Candidate Starts for Dattran\_48:  
(Start: 15 @32114 has 94 MA's), (36, 32174), (42, 32228), (46, 32252), (52, 32297), (58, 32369), (62, 32387), (67, 32438), (68, 32441), (74, 32474), (76, 32480),

Gene: Daudau\_47 Start: 32428, Stop: 32808, Start Num: 14  
Candidate Starts for Daudau\_47:  
(Start: 14 @32428 has 1 MA's), (20, 32458), (60, 32716), (62, 32722), (65, 32767), (68, 32776), (72, 32803),

Gene: Dexers\_45 Start: 32760, Stop: 33143, Start Num: 15  
Candidate Starts for Dexers\_45:  
(Start: 15 @32760 has 94 MA's), (29, 32802), (54, 32988), (65, 33099), (73, 33138),

Gene: Diane\_46 Start: 32305, Stop: 32781, Start Num: 13  
Candidate Starts for Diane\_46:  
(3, 31909), (4, 31912), (8, 32098), (Start: 13 @32305 has 8 MA's), (23, 32398), (26, 32413), (43, 32545), (62, 32695), (67, 32746), (68, 32749), (72, 32776),

Gene: Dwayne\_46 Start: 31523, Stop: 31891, Start Num: 15

Candidate Starts for Dwayne\_46:

(Start: 15 @31523 has 94 MA's), (34, 31574), (36, 31583), (44, 31655), (46, 31661), (49, 31679), (52, 31706), (53, 31709), (58, 31778), (60, 31790), (68, 31850), (70, 31865), (74, 31883), (75, 31886),

Gene: ELB20\_46 Start: 32925, Stop: 33302, Start Num: 15

Candidate Starts for ELB20\_46:

(Start: 15 @32925 has 94 MA's), (20, 32949), (63, 33219), (67, 33267), (68, 33270), (72, 33297),

Gene: Eddasa\_47 Start: 31500, Stop: 31865, Start Num: 15

Candidate Starts for Eddasa\_47:

(1, 30990), (9, 31281), (Start: 15 @31500 has 94 MA's), (34, 31545), (40, 31587), (51, 31671), (52, 31677), (63, 31770), (67, 31818), (68, 31821), (74, 31854), (76, 31860),

Gene: Ejemplo\_45 Start: 31458, Stop: 31847, Start Num: 15

Candidate Starts for Ejemplo\_45:

(Start: 15 @31458 has 94 MA's), (39, 31566), (44, 31608), (52, 31659), (62, 31749), (68, 31803), (70, 31818), (74, 31836), (76, 31842),

Gene: ElGato\_47 Start: 32400, Stop: 32783, Start Num: 15

Candidate Starts for ElGato\_47:

(Start: 15 @32400 has 94 MA's), (29, 32442), (30, 32454), (33, 32469), (54, 32628), (65, 32739), (73, 32778),

Gene: Emaanora\_49 Start: 31481, Stop: 31849, Start Num: 15

Candidate Starts for Emaanora\_49:

(Start: 15 @31481 has 94 MA's), (34, 31532), (36, 31541), (44, 31613), (46, 31619), (49, 31637), (52, 31664), (53, 31667), (58, 31736), (60, 31748), (68, 31808), (70, 31823), (74, 31841), (75, 31844),

Gene: EnochSoames\_49 Start: 31495, Stop: 31860, Start Num: 15

Candidate Starts for EnochSoames\_49:

(Start: 15 @31495 has 94 MA's), (34, 31540), (40, 31582), (51, 31666), (52, 31672), (67, 31813), (68, 31816), (74, 31849), (76, 31855),

Gene: Esperer\_46 Start: 31003, Stop: 31380, Start Num: 15

Candidate Starts for Esperer\_46:

(9, 30784), (Start: 15 @31003 has 94 MA's), (29, 31045), (43, 31144), (62, 31294), (65, 31339),

Gene: GirlDinner\_46 Start: 32081, Stop: 32455, Start Num: 15

Candidate Starts for GirlDinner\_46:

(8, 31874), (Start: 15 @32081 has 94 MA's), (20, 32105), (60, 32363), (62, 32369), (67, 32420), (68, 32423), (72, 32450),

Gene: Goby\_46 Start: 32013, Stop: 32384, Start Num: 15

Candidate Starts for Goby\_46:

(Start: 15 @32013 has 94 MA's), (36, 32073), (42, 32127), (46, 32151), (52, 32196), (58, 32268), (62, 32286), (67, 32337), (68, 32340), (74, 32373), (76, 32379),

Gene: Godpower\_47 Start: 31987, Stop: 32364, Start Num: 15

Candidate Starts for Godpower\_47:

(8, 31762), (9, 31768), (Start: 15 @31987 has 94 MA's), (32, 32047), (34, 32056), (36, 32065), (48, 32152), (64, 32287), (65, 32323), (68, 32332), (71, 32353), (72, 32359),

Gene: Haizum\_48 Start: 32420, Stop: 32908, Start Num: 13

Candidate Starts for Haizum\_48:

(3, 32024), (4, 32027), (8, 32213), (Start: 13 @32420 has 8 MA's), (29, 32564), (50, 32714), (62, 32822), (68, 32876), (72, 32903),

Gene: Hank144\_49 Start: 32633, Stop: 33007, Start Num: 15

Candidate Starts for Hank144\_49:

(Start: 15 @32633 has 94 MA's), (20, 32657), (57, 32879), (67, 32972), (68, 32975), (72, 33002),

Gene: Hippo\_46 Start: 31535, Stop: 31903, Start Num: 15

Candidate Starts for Hippo\_46:

(Start: 15 @31535 has 94 MA's), (34, 31586), (36, 31595), (44, 31667), (46, 31673), (49, 31691), (52, 31718), (53, 31721), (58, 31790), (60, 31802), (68, 31862), (70, 31877), (74, 31895), (75, 31898),

Gene: Hydra\_47 Start: 31839, Stop: 32216, Start Num: 15

Candidate Starts for Hydra\_47:

(Start: 15 @31839 has 94 MA's), (29, 31881), (43, 31980), (62, 32130), (65, 32175),

Gene: Indigo\_45 Start: 31183, Stop: 31560, Start Num: 15

Candidate Starts for Indigo\_45:

(9, 30964), (Start: 15 @31183 has 94 MA's), (29, 31225), (43, 31324), (62, 31474), (65, 31519),

Gene: Issmi\_48 Start: 33004, Stop: 33390, Start Num: 13

Candidate Starts for Issmi\_48:

(8, 32797), (Start: 13 @33004 has 8 MA's), (20, 33046), (35, 33085), (62, 33301), (67, 33352),

Gene: Izzy\_47 Start: 31547, Stop: 31912, Start Num: 15

Candidate Starts for Izzy\_47:

(1, 31037), (9, 31328), (Start: 15 @31547 has 94 MA's), (34, 31592), (40, 31634), (51, 31718), (52, 31724), (63, 31817), (67, 31865), (68, 31868), (74, 31901), (76, 31907),

Gene: Janus\_47 Start: 32421, Stop: 32795, Start Num: 15

Candidate Starts for Janus\_47:

(8, 32214), (Start: 15 @32421 has 94 MA's), (20, 32445), (60, 32703), (62, 32709), (67, 32760), (68, 32763), (72, 32790),

Gene: Jash\_47 Start: 31500, Stop: 31865, Start Num: 15

Candidate Starts for Jash\_47:

(1, 30990), (9, 31281), (Start: 15 @31500 has 94 MA's), (34, 31545), (40, 31587), (51, 31671), (52, 31677), (63, 31770), (67, 31818), (68, 31821), (74, 31854), (76, 31860),

Gene: Jevington\_49 Start: 32807, Stop: 33181, Start Num: 15

Candidate Starts for Jevington\_49:

(Start: 15 @32807 has 94 MA's), (20, 32831), (39, 32912), (58, 33077), (65, 33140), (68, 33149), (72, 33176),

Gene: Jhitchelle\_45 Start: 32283, Stop: 32648, Start Num: 15

Candidate Starts for Jhitchelle\_45:

(Start: 15 @32283 has 94 MA's), (27, 32292), (29, 32310), (56, 32514), (59, 32553), (61, 32559), (65, 32607), (67, 32613), (73, 32643),

Gene: Kaine\_46 Start: 32551, Stop: 32949, Start Num: 15

Candidate Starts for Kaine\_46:

(Start: 15 @32551 has 94 MA's), (17, 32563), (29, 32608), (65, 32905), (69, 32926), (70, 32929), (72, 32941), (73, 32944),

Gene: Katalie\_46 Start: 31733, Stop: 32098, Start Num: 15

Candidate Starts for Katalie\_46:

(Start: 15 @31733 has 94 MA's), (36, 31787), (40, 31820), (52, 31910), (58, 31982), (67, 32051), (68, 32054), (72, 32081), (74, 32087), (76, 32093),

Gene: Lannister\_48 Start: 32190, Stop: 32480, Start Num: 15

Candidate Starts for Lannister\_48:

(Start: 15 @32190 has 94 MA's), (67, 32436), (68, 32439), (69, 32451), (72, 32466), (75, 32475),

Gene: Legacy\_45 Start: 31282, Stop: 31659, Start Num: 15

Candidate Starts for Legacy\_45:

(Start: 15 @31282 has 94 MA's), (29, 31324), (43, 31423), (62, 31573), (65, 31618),

Gene: Leviticus\_46 Start: 31187, Stop: 31564, Start Num: 15

Candidate Starts for Leviticus\_46:

(9, 30968), (Start: 15 @31187 has 94 MA's), (29, 31229), (43, 31328), (62, 31478), (65, 31523),

Gene: Lika\_46 Start: 31990, Stop: 32367, Start Num: 15

Candidate Starts for Lika\_46:

(8, 31765), (9, 31771), (Start: 15 @31990 has 94 MA's), (32, 32050), (36, 32068), (48, 32155), (64, 32290), (65, 32326), (68, 32335), (71, 32356), (72, 32362),

Gene: Loofah\_48 Start: 32810, Stop: 33187, Start Num: 15

Candidate Starts for Loofah\_48:

(Start: 15 @32810 has 94 MA's), (20, 32834), (63, 33104), (67, 33152), (68, 33155), (72, 33182),

Gene: Lorelei\_47 Start: 32044, Stop: 32397, Start Num: 15

Candidate Starts for Lorelei\_47:

(Start: 15 @32044 has 94 MA's), (32, 32080), (34, 32089), (36, 32098), (40, 32131), (48, 32185), (64, 32320), (65, 32356), (68, 32365), (71, 32386), (72, 32392),

Gene: Maneekul\_46 Start: 31548, Stop: 31937, Start Num: 15

Candidate Starts for Maneekul\_46:

(Start: 15 @31548 has 94 MA's), (39, 31656), (44, 31698), (49, 31722), (52, 31749), (62, 31839), (68, 31893), (70, 31908), (76, 31932),

Gene: Marav\_50 Start: 33123, Stop: 33497, Start Num: 15

Candidate Starts for Marav\_50:

(Start: 15 @33123 has 94 MA's), (20, 33147), (39, 33228), (62, 33411), (65, 33456), (68, 33465), (72, 33492),

Gene: Nabi\_47 Start: 32044, Stop: 32397, Start Num: 15

Candidate Starts for Nabi\_47:

(Start: 15 @32044 has 94 MA's), (32, 32080), (34, 32089), (36, 32098), (40, 32131), (48, 32185), (64, 32320), (65, 32356), (68, 32365), (71, 32386), (72, 32392),

Gene: Nanodon\_48 Start: 31827, Stop: 32165, Start Num: 15

Candidate Starts for Nanodon\_48:

(5, 31419), (9, 31608), (Start: 15 @31827 has 94 MA's), (41, 31905), (44, 31929), (56, 32022), (67, 32121), (68, 32124),

Gene: Nerdos\_45 Start: 31182, Stop: 31559, Start Num: 15

Candidate Starts for Nerdos\_45:

(9, 30963), (Start: 15 @31182 has 94 MA's), (29, 31224), (43, 31323), (62, 31473), (65, 31518),

Gene: Nishikigoi\_48 Start: 32420, Stop: 32908, Start Num: 13

Candidate Starts for Nishikigoi\_48:

(3, 32024), (4, 32027), (8, 32213), (Start: 13 @32420 has 8 MA's), (29, 32564), (50, 32714), (62, 32822), (68, 32876), (72, 32903),

Gene: Oliynyk\_47 Start: 31500, Stop: 31865, Start Num: 15

Candidate Starts for Oliynyk\_47:

(1, 30990), (9, 31281), (Start: 15 @31500 has 94 MA's), (34, 31545), (40, 31587), (51, 31671), (52, 31677), (63, 31770), (67, 31818), (68, 31821), (74, 31854), (76, 31860),

Gene: Omar\_49 Start: 32599, Stop: 33057, Start Num: 13

Candidate Starts for Omar\_49:

(4, 32209), (8, 32392), (Start: 13 @32599 has 8 MA's), (29, 32713), (35, 32752), (36, 32755), (59, 32962), (60, 32965), (62, 32971), (65, 33016), (68, 33025), (72, 33052),

Gene: Ozzie\_45 Start: 31291, Stop: 31668, Start Num: 15

Candidate Starts for Ozzie\_45:

(Start: 15 @31291 has 94 MA's), (29, 31333), (37, 31390), (43, 31432), (62, 31582), (65, 31627),

Gene: OzzyJ\_47 Start: 31523, Stop: 31891, Start Num: 15

Candidate Starts for OzzyJ\_47:

(Start: 15 @31523 has 94 MA's), (34, 31574), (36, 31583), (44, 31655), (46, 31661), (49, 31679), (52, 31706), (53, 31709), (58, 31778), (60, 31790), (68, 31850), (70, 31865), (74, 31883), (75, 31886),

Gene: Pablito\_47 Start: 32215, Stop: 32589, Start Num: 15

Candidate Starts for Pablito\_47:

(7, 31873), (8, 31999), (Start: 15 @32215 has 94 MA's), (16, 32221), (20, 32239), (67, 32554), (68, 32557), (72, 32584),

Gene: Paedore\_47 Start: 32795, Stop: 33172, Start Num: 15

Candidate Starts for Paedore\_47:

(Start: 15 @32795 has 94 MA's), (20, 32819), (63, 33089), (67, 33137), (68, 33140), (72, 33167),

Gene: Paolo\_49 Start: 32982, Stop: 33356, Start Num: 15

Candidate Starts for Paolo\_49:

(6, 32598), (8, 32775), (Start: 15 @32982 has 94 MA's), (20, 33006), (39, 33087), (65, 33315), (68, 33324), (72, 33351),

Gene: Pavo\_47 Start: 33000, Stop: 33383, Start Num: 15

Candidate Starts for Pavo\_47:

(Start: 15 @33000 has 94 MA's), (29, 33042), (30, 33054), (33, 33069), (54, 33228), (65, 33339), (73, 33378),

Gene: Phettuccine\_46 Start: 31183, Stop: 31560, Start Num: 15

Candidate Starts for Phettuccine\_46:

(9, 30964), (Start: 15 @31183 has 94 MA's), (29, 31225), (43, 31324), (62, 31474), (65, 31519),

Gene: Provolone\_47 Start: 32382, Stop: 32765, Start Num: 15

Candidate Starts for Provolone\_47:

(Start: 15 @32382 has 94 MA's), (29, 32424), (30, 32436), (33, 32451), (54, 32610), (65, 32721), (73, 32760),

Gene: Puginator\_49 Start: 33000, Stop: 33374, Start Num: 15

Candidate Starts for Puginator\_49:

(6, 32616), (8, 32793), (Start: 15 @33000 has 94 MA's), (20, 33024), (39, 33105), (65, 33333), (68, 33342), (72, 33369),

Gene: R4\_48 Start: 32941, Stop: 33318, Start Num: 15

Candidate Starts for R4\_48:

(Start: 15 @32941 has 94 MA's), (20, 32965), (56, 33181), (63, 33235), (67, 33283), (68, 33286), (72, 33313),

Gene: Rana\_47 Start: 32044, Stop: 32397, Start Num: 15

Candidate Starts for Rana\_47:

(Start: 15 @32044 has 94 MA's), (32, 32080), (34, 32089), (36, 32098), (40, 32131), (48, 32185), (64, 32320), (65, 32356), (68, 32365), (71, 32386), (72, 32392),

Gene: RedBear\_47 Start: 31733, Stop: 32098, Start Num: 15

Candidate Starts for RedBear\_47:

(Start: 15 @31733 has 94 MA's), (36, 31787), (40, 31820), (52, 31910), (58, 31982), (67, 32051), (68, 32054), (72, 32081), (74, 32087), (76, 32093),

Gene: Rusticus\_47 Start: 31500, Stop: 31865, Start Num: 15

Candidate Starts for Rusticus\_47:

(1, 30990), (9, 31281), (Start: 15 @31500 has 94 MA's), (34, 31545), (40, 31587), (51, 31671), (52, 31677), (63, 31770), (67, 31818), (68, 31821), (74, 31854), (76, 31860),

Gene: Saftant\_46 Start: 32957, Stop: 33322, Start Num: 15

Candidate Starts for Saftant\_46:

(Start: 15 @32957 has 94 MA's), (27, 32966), (29, 32984), (43, 33086), (54, 33170), (56, 33188), (65, 33281), (67, 33287), (73, 33317),

Gene: SarahRose\_46 Start: 31531, Stop: 31899, Start Num: 15

Candidate Starts for SarahRose\_46:

(Start: 15 @31531 has 94 MA's), (34, 31582), (36, 31591), (44, 31663), (46, 31669), (49, 31687), (52, 31714), (53, 31717), (58, 31786), (60, 31798), (68, 31858), (70, 31873), (74, 31891), (75, 31894),

Gene: Snorlax\_46 Start: 31535, Stop: 31903, Start Num: 15

Candidate Starts for Snorlax\_46:

(Start: 15 @31535 has 94 MA's), (34, 31586), (36, 31595), (44, 31667), (46, 31673), (52, 31718), (53, 31721), (60, 31802), (68, 31862), (70, 31877), (74, 31895), (75, 31898),

Gene: South40\_46 Start: 31733, Stop: 32098, Start Num: 15

Candidate Starts for South40\_46:

(Start: 15 @31733 has 94 MA's), (36, 31787), (40, 31820), (52, 31910), (58, 31982), (67, 32051), (68, 32054), (72, 32081), (74, 32087), (76, 32093),

Gene: Speedwell\_51 Start: 34247, Stop: 34642, Start Num: 15

Candidate Starts for Speedwell\_51:

(Start: 15 @34247 has 94 MA's), (25, 34274), (29, 34304), (30, 34316), (62, 34556), (69, 34622), (70, 34625), (73, 34637),

Gene: SqueakyClean\_46 Start: 32512, Stop: 32886, Start Num: 15

Candidate Starts for SqueakyClean\_46:

(8, 32305), (Start: 15 @32512 has 94 MA's), (20, 32536), (60, 32794), (62, 32800), (67, 32851), (68, 32854), (72, 32881),

Gene: Sudan\_46 Start: 32838, Stop: 33236, Start Num: 15

Candidate Starts for Sudan\_46:

(Start: 15 @32838 has 94 MA's), (17, 32850), (29, 32895), (65, 33192), (69, 33213), (70, 33216), (72, 33228), (73, 33231),

Gene: Sujidade\_47 Start: 32278, Stop: 32655, Start Num: 15

Candidate Starts for Sujidade\_47:

(2, 31849), (7, 31927), (8, 32053), (9, 32059), (Start: 15 @32278 has 94 MA's), (32, 32338), (34, 32347), (36, 32356), (48, 32443), (64, 32578), (65, 32614), (68, 32623), (71, 32644), (72, 32650),

Gene: SunkenRoot\_47 Start: 33440, Stop: 33856, Start Num: 15

Candidate Starts for SunkenRoot\_47:

(Start: 15 @33440 has 94 MA's), (25, 33485), (29, 33515), (54, 33701), (65, 33812), (72, 33848), (73, 33851),

Gene: SunsetPointe\_45 Start: 31298, Stop: 31675, Start Num: 15

Candidate Starts for SunsetPointe\_45:

(Start: 15 @31298 has 94 MA's), (29, 31340), (43, 31439), (62, 31589), (65, 31634),

Gene: Superstar\_51 Start: 33684, Stop: 34070, Start Num: 13

Candidate Starts for Superstar\_51:

(12, 33675), (Start: 13 @33684 has 8 MA's), (20, 33738), (43, 33834), (47, 33855), (55, 33921), (58, 33966), (62, 33984), (67, 34035), (68, 34038),

Gene: TagePighter\_48 Start: 31535, Stop: 31903, Start Num: 15

Candidate Starts for TagePighter\_48:

(Start: 15 @31535 has 94 MA's), (34, 31586), (36, 31595), (44, 31667), (46, 31673), (49, 31691), (52, 31718), (58, 31790), (60, 31802), (68, 31862), (70, 31877), (74, 31895), (75, 31898),

Gene: Tefunt\_48 Start: 32422, Stop: 32910, Start Num: 13

Candidate Starts for Tefunt\_48:

(3, 32026), (4, 32029), (8, 32215), (Start: 13 @32422 has 8 MA's), (29, 32566), (50, 32716), (62, 32824), (68, 32878), (72, 32905),

Gene: Thestral\_48 Start: 32613, Stop: 32987, Start Num: 15

Candidate Starts for Thestral\_48:

(Start: 15 @32613 has 94 MA's), (20, 32637), (45, 32763), (62, 32901), (68, 32955), (72, 32982),

Gene: TinaBelcher\_46 Start: 32560, Stop: 32934, Start Num: 15

Candidate Starts for TinaBelcher\_46:

(8, 32353), (Start: 15 @32560 has 94 MA's), (20, 32584), (45, 32710), (62, 32848), (72, 32929),

Gene: Toma\_46 Start: 32013, Stop: 32384, Start Num: 15

Candidate Starts for Toma\_46:

(Start: 15 @32013 has 94 MA's), (36, 32073), (42, 32127), (46, 32151), (52, 32196), (58, 32268), (62, 32286), (67, 32337), (68, 32340), (74, 32373), (76, 32379),

Gene: Triste\_46 Start: 31523, Stop: 31891, Start Num: 15

Candidate Starts for Triste\_46:

(Start: 15 @31523 has 94 MA's), (34, 31574), (36, 31583), (44, 31655), (46, 31661), (49, 31679), (52, 31706), (53, 31709), (58, 31778), (60, 31790), (68, 31850), (70, 31865), (74, 31883), (75, 31886),

Gene: Triumph\_49 Start: 32544, Stop: 32918, Start Num: 15

Candidate Starts for Triumph\_49:

(Start: 15 @32544 has 94 MA's), (20, 32568), (38, 32634), (39, 32649), (62, 32832), (67, 32883), (68, 32886), (72, 32913),

Gene: TrvxScott\_45 Start: 32606, Stop: 32980, Start Num: 15

Candidate Starts for TrvxScott\_45:

(8, 32399), (Start: 15 @32606 has 94 MA's), (20, 32630), (45, 32756), (62, 32894), (72, 32975),

Gene: TuanPN\_45 Start: 31458, Stop: 31847, Start Num: 15

Candidate Starts for TuanPN\_45:

(Start: 15 @31458 has 94 MA's), (39, 31566), (44, 31608), (52, 31659), (62, 31749), (68, 31803), (70, 31818), (74, 31836), (76, 31842),

Gene: Unstoppable\_46 Start: 31178, Stop: 31555, Start Num: 15

Candidate Starts for Unstoppable\_46:

(9, 30959), (Start: 15 @31178 has 94 MA's), (29, 31220), (43, 31319), (62, 31469), (65, 31514),

Gene: Vanseggelen\_51 Start: 32486, Stop: 32854, Start Num: 15

Candidate Starts for Vanseggelen\_51:

(Start: 15 @32486 has 94 MA's), (29, 32516), (30, 32528), (31, 32531), (45, 32630), (62, 32768), (68, 32822), (69, 32834), (73, 32849),

Gene: Verabelle\_50 Start: 33047, Stop: 33418, Start Num: 15

Candidate Starts for Verabelle\_50:

(8, 32825), (9, 32831), (Start: 15 @33047 has 94 MA's), (29, 33080), (31, 33095), (56, 33284), (65, 33377), (67, 33383), (68, 33386), (73, 33413),

Gene: Verse\_46 Start: 33634, Stop: 34029, Start Num: 15

Candidate Starts for Verse\_46:

(Start: 15 @33634 has 94 MA's), (19, 33655), (27, 33667), (29, 33691), (49, 33826), (52, 33853), (65, 33988), (67, 33994), (73, 34024),

Gene: Werner\_46 Start: 31533, Stop: 31901, Start Num: 15

Candidate Starts for Werner\_46:

(Start: 15 @31533 has 94 MA's), (34, 31584), (36, 31593), (44, 31665), (46, 31671), (49, 31689), (52, 31716), (53, 31719), (60, 31800), (68, 31860), (70, 31875), (74, 31893), (75, 31896),

Gene: Whatever\_46 Start: 31533, Stop: 31901, Start Num: 15

Candidate Starts for Whatever\_46:

(Start: 15 @31533 has 94 MA's), (34, 31584), (36, 31593), (44, 31665), (46, 31671), (49, 31689), (52, 31716), (53, 31719), (58, 31788), (60, 31800), (68, 31860), (70, 31875), (74, 31893), (75, 31896),

Gene: Yasdniil\_46 Start: 31576, Stop: 31965, Start Num: 15

Candidate Starts for Yasdniil\_46:

(Start: 15 @31576 has 94 MA's), (39, 31684), (44, 31726), (49, 31750), (52, 31777), (62, 31867), (68, 31921), (70, 31936), (76, 31960),

Gene: Yosif\_49 Start: 33615, Stop: 34058, Start Num: 15

Candidate Starts for Yosif\_49:

(8, 33390), (9, 33396), (11, 33522), (Start: 15 @33615 has 94 MA's), (18, 33630), (21, 33660), (22, 33666), (23, 33669), (24, 33687), (29, 33720), (62, 33972), (65, 34017), (66, 34020),

Gene: Zainub\_49 Start: 32960, Stop: 33334, Start Num: 15

Candidate Starts for Zainub\_49:

(Start: 15 @32960 has 94 MA's), (20, 32984), (39, 33065), (65, 33293), (68, 33302), (72, 33329),

Gene: ZamZam\_46 Start: 32933, Stop: 33304, Start Num: 15

Candidate Starts for ZamZam\_46:

(Start: 15 @32933 has 94 MA's), (28, 32948), (29, 32966), (31, 32981), (37, 33026), (52, 33128), (62, 33218), (73, 33299),

Gene: Zemlya\_48 Start: 32063, Stop: 32416, Start Num: 15

Candidate Starts for Zemlya\_48:

(Start: 15 @32063 has 94 MA's), (32, 32099), (34, 32108), (36, 32117), (48, 32204), (64, 32339), (65, 32375), (68, 32384), (71, 32405), (72, 32411),

Gene: phiCAM\_44 Start: 34878, Stop: 35216, Start Num: 29

Candidate Starts for phiCAM\_44:

(Start: 15 @34785 has 94 MA's), (25, 34848), (29, 34878), (31, 34893), (50, 35022), (62, 35130), (68, 35184), (69, 35196), (73, 35211),