



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 294666 Report

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

Pham number 294666 has 77 members, 22 are drafts.

Phages represented in each track:

- Track 1 : Jesabah\_60, Mesmerelda\_58
- Track 2 : Nyala\_58, Dice\_58, Tomlarah\_60, ShiVal\_57, Olak\_58, Vaticameos\_56, Selr12\_60
- Track 3 : Mecca\_59, Samaymay\_59, FremontTroll\_60, Lego3393\_58, CamL\_59, Bluephacebaby\_59, Kimbrough\_60, ProfessorX\_59, Omniscient\_60
- Track 4 : QueenBeane\_59
- Track 5 : Banjo\_58
- Track 6 : BobbyK\_53, Hangman\_52, JoyceMaria\_52
- Track 7 : Fanaw\_51
- Track 8 : Epah\_51, Fortunato\_53, ChrisnMich\_52, Lambano\_51, Antihero\_51, Lolalove\_53, GinPorsche\_52, Nanao\_51, Ahwei\_51, Poster\_51, Hally898\_51, Hydro\_52
- Track 9 : Prince\_52, Apex\_53, Austelle\_53, Renkei\_51, LittleDigger\_51, Mudslide\_52
- Track 10 : Stinger\_52
- Track 11 : Xincheng\_53, JaguarMi\_54
- Track 12 : AlanGrant\_55, Vincenzo\_54
- Track 13 : JAMaL\_52
- Track 14 : Zemanar\_53
- Track 15 : Waleliano\_52, BrownCNA\_54
- Track 16 : Heath\_51
- Track 17 : Magpie\_51
- Track 18 : Cooper\_53
- Track 19 : Frederick\_53, RawrgerThat\_53
- Track 20 : Mithril\_52, VioletZ\_54
- Track 21 : QueenPie\_50
- Track 22 : Acadian\_57
- Track 23 : EastView9101\_56
- Track 24 : DigitDog\_57
- Track 25 : KarasumaRum\_57, StinkyVeggy\_57
- Track 26 : Suigeneris\_58
- Track 27 : Rich\_57
- Track 28 : Phelemich\_55, Reprobate\_56
- Track 29 : Serendipitous\_55
- Track 30 : Mysterious\_55, Nehemiah\_56
- Track 31 : Nangang\_57
- Track 32 : Shenyu\_57

- Track 33 : Bae\_58
- Track 34 : SirJeffery\_56
- Track 35 : Rinkes\_55
- Track 36 : CRB2\_56

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

The start number called the most often in the published annotations is 4, it was called in 21 of the 55 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Ahwei\_51, Antihero\_51, Apex\_53, Austelle\_53, BobbyK\_53, BrownCNA\_54, ChrisnMich\_52, Epah\_51, Fanaw\_51, Fortunato\_53, Frederick\_53, GinPorsche\_52, Hally898\_51, Hangman\_52, Heath\_51, Hydro\_52, JAMaL\_52, JaguarMi\_54, JoyceMaria\_52, Lambano\_51, LittleDigger\_51, Lolalove\_53, Magpie\_51, Mithril\_52, Mudslide\_52, Nanao\_51, Poster\_51, Prince\_52, QueenPie\_50, RawrgerThat\_53, Renkei\_51, VioletZ\_54, Waleliano\_52, Xincheng\_53, Zemanar\_53,

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

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

- Acadian\_57, AlanGrant\_55, Bae\_58, Banjo\_58, Bluephacebaby\_59, CRB2\_56, CamL\_59, Cooper\_53, Dice\_58, DigitDog\_57, EastView9101\_56, FremontTroll\_60, Jesabah\_60, KarasumaRum\_57, Kimbrough\_60, Lego3393\_58, Mecca\_59, Mesmerelda\_58, Mysterious\_55, Nangang\_57, Nehemiah\_56, Nyala\_58, Olak\_58, Omniscient\_60, Phelemich\_55, ProfessorX\_59, QueenBeane\_59, Reprobate\_56, Rich\_57, Rinkes\_55, Samaymay\_59, Selr12\_60, Serendipitous\_55, Shenyu\_57, ShiVal\_57, SirJeffery\_56, Stinger\_52, StinkyVeggy\_57, Suigeneris\_58, Tomlahar\_60, Vaticameos\_56, Vincenzo\_54,

### **Summary by start number:**

Start 3:

- Found in 2 of 77 ( 2.6% ) of genes in pham
- Manual Annotations of this start: 1 of 55
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Stinger\_52 (B4),

Start 4:

- Found in 35 of 77 ( 45.5% ) of genes in pham
- Manual Annotations of this start: 21 of 55
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ahwei\_51 (B4), Antihero\_51 (B4), Apex\_53 (B4), Austelle\_53 (B4), BobbyK\_53 (B4), BrownCNA\_54 (B4), ChrisnMich\_52 (B4), Epah\_51 (B4), Fanaw\_51 (B4), Fortunato\_53 (B4), Frederick\_53 (B4), GinPorsche\_52 (B4), Hally898\_51 (B4), Hangman\_52 (B4), Heath\_51 (B4), Hydro\_52 (B4), JAMaL\_52 (B4), JaguarMi\_54 (B4), JoyceMaria\_52 (B4), Lambano\_51 (B4), LittleDigger\_51 (B4), Lolalove\_53 (B4), Magpie\_51 (B4), Mithril\_52 (B4), Mudslide\_52 (B4), Nanao\_51 (B4), Poster\_51 (B4), Prince\_52 (B4),

QueenPie\_50 (B4), RawrgerThat\_53 (B4), Renkei\_51 (B4), VioletZ\_54 (B4), Waleliano\_52 (B4), Xincheng\_53 (B4), Zemanar\_53 (B4),

Start 5:

- Found in 1 of 77 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 55
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Cooper\_53 (B4),

Start 6:

- Found in 10 of 77 ( 13.0% ) of genes in pham
- Manual Annotations of this start: 7 of 55
- Called 80.0% of time when present
- Phage (with cluster) where this start called: Bae\_58 (B5), EastView9101\_56 (B5), Mysterious\_55 (B5), Nehemiah\_56 (B5), Phelemich\_55 (B5), Reprobate\_56 (B5), Serendipitous\_55 (B5), Suigeneris\_58 (B5),

Start 7:

- Found in 2 of 77 ( 2.6% ) of genes in pham
- Manual Annotations of this start: 2 of 55
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AlanGrant\_55 (B4), Vincenzo\_54 (B4),

Start 11:

- Found in 6 of 77 ( 7.8% ) of genes in pham
- Manual Annotations of this start: 1 of 55
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Acadian\_57 (B5), DigitDog\_57 (B5), KarasumaRum\_57 (B5), Nangang\_57 (B5), Shenyu\_57 (B5), StinkyVeggy\_57 (B5),

Start 12:

- Found in 1 of 77 ( 1.3% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: SirJeffery\_56 (B5),

Start 18:

- Found in 20 of 77 ( 26.0% ) of genes in pham
- Manual Annotations of this start: 3 of 55
- Called 15.0% of time when present
- Phage (with cluster) where this start called: Banjo\_58 (B1), Jesabah\_60 (B1), Mesmerelda\_58 (B1),

Start 19:

- Found in 18 of 77 ( 23.4% ) of genes in pham
- Manual Annotations of this start: 15 of 55
- Called 88.9% of time when present
- Phage (with cluster) where this start called: Bluephacebaby\_59 (B1), CamL\_59 (B1), Dice\_58 (B1), FremontTroll\_60 (B1), Kimbrough\_60 (B1), Lego3393\_58 (B1), Mecca\_59 (B1), Nyala\_58 (B1), Olak\_58 (B1), Omniscient\_60 (B1), ProfessorX\_59 (B1), Samaymay\_59 (B1), Selr12\_60 (B1), ShiVal\_57 (B1), Tomlarah\_60 (B1), Vaticameos\_56 (B1),

Start 22:

- Found in 13 of 77 ( 16.9% ) of genes in pham
- Manual Annotations of this start: 1 of 55
- Called 7.7% of time when present
- Phage (with cluster) where this start called: Rich\_57 (B5),

Start 27:

- Found in 20 of 77 ( 26.0% ) of genes in pham
- Manual Annotations of this start: 1 of 55
- Called 5.0% of time when present
- Phage (with cluster) where this start called: QueenBeane\_59 (B1),

Start 33:

- Found in 2 of 77 ( 2.6% ) of genes in pham
- Manual Annotations of this start: 2 of 55
- Called 100.0% of time when present
- Phage (with cluster) where this start called: CRB2\_56 (B9), Rinkes\_55 (B9),

**Summary by clusters:**

There are 4 clusters represented in this pham: B4, B5, B1, B9,

Info for manual annotations of cluster B1:

- Start number 18 was manually annotated 3 times for cluster B1.
- Start number 19 was manually annotated 15 times for cluster B1.
- Start number 27 was manually annotated 1 time for cluster B1.

Info for manual annotations of cluster B4:

- Start number 3 was manually annotated 1 time for cluster B4.
- Start number 4 was manually annotated 21 times for cluster B4.
- Start number 5 was manually annotated 1 time for cluster B4.
- Start number 7 was manually annotated 2 times for cluster B4.

Info for manual annotations of cluster B5:

- Start number 6 was manually annotated 7 times for cluster B5.
- Start number 11 was manually annotated 1 time for cluster B5.
- Start number 22 was manually annotated 1 time for cluster B5.

Info for manual annotations of cluster B9:

- Start number 33 was manually annotated 2 times for cluster B9.

**Gene Information:**

Gene: Acadian\_57 Start: 52639, Stop: 51956, Start Num: 11

Candidate Starts for Acadian\_57:

(10, 52663), (Start: 11 @52639 has 1 MA's), (Start: 22 @52519 has 1 MA's), (26, 52498), (38, 52399), (47, 52351), (55, 52279), (66, 52132), (69, 52117), (73, 52075),

Gene: Ahwei\_51 Start: 51165, Stop: 50473, Start Num: 4

Candidate Starts for Ahwei\_51:

(Start: 4 @51165 has 21 MA's), (8, 51141), (14, 51006), (47, 50847), (49, 50823), (51, 50796), (54, 50778), (60, 50712), (61, 50691), (65, 50640), (66, 50637), (71, 50607), (74, 50595), (76, 50586), (77, 50580), (81, 50529),

Gene: AlanGrant\_55 Start: 53102, Stop: 52275, Start Num: 7

Candidate Starts for AlanGrant\_55:

(Start: 7 @53102 has 2 MA's), (8, 53096), (13, 52961), (15, 52928), (24, 52820), (28, 52778), (34, 52742), (35, 52727), (51, 52616), (53, 52604), (56, 52574), (58, 52538), (66, 52439), (71, 52409), (74, 52397), (75, 52394), (78, 52367), (80, 52334),

Gene: Antihero\_51 Start: 51163, Stop: 50471, Start Num: 4

Candidate Starts for Antihero\_51:

(Start: 4 @51163 has 21 MA's), (8, 51139), (14, 51004), (47, 50845), (49, 50821), (51, 50794), (54, 50776), (60, 50710), (61, 50689), (65, 50638), (66, 50635), (71, 50605), (74, 50593), (76, 50584), (77, 50578), (81, 50527),

Gene: Apex\_53 Start: 52379, Stop: 51633, Start Num: 4

Candidate Starts for Apex\_53:

(Start: 4 @52379 has 21 MA's), (8, 52355), (14, 52220), (37, 52058), (47, 52007), (49, 51983), (51, 51956), (54, 51938), (60, 51872), (61, 51851), (65, 51800), (66, 51797), (71, 51767), (74, 51755), (76, 51746), (77, 51740), (81, 51689),

Gene: Austelle\_53 Start: 52832, Stop: 52086, Start Num: 4

Candidate Starts for Austelle\_53:

(Start: 4 @52832 has 21 MA's), (8, 52808), (14, 52673), (37, 52511), (47, 52460), (49, 52436), (51, 52409), (54, 52391), (60, 52325), (61, 52304), (65, 52253), (66, 52250), (71, 52220), (74, 52208), (76, 52199), (77, 52193), (81, 52142),

Gene: Bae\_58 Start: 53704, Stop: 53204, Start Num: 6

Candidate Starts for Bae\_58:

(Start: 6 @53704 has 7 MA's), (21, 53590), (Start: 22 @53587 has 1 MA's), (55, 53518), (65, 53383), (74, 53338),

Gene: Banjo\_58 Start: 52199, Stop: 51576, Start Num: 18

Candidate Starts for Banjo\_58:

(16, 52253), (Start: 18 @52199 has 3 MA's), (Start: 19 @52187 has 15 MA's), (23, 52160), (Start: 27 @52142 has 1 MA's), (32, 52088), (36, 52055), (42, 52022), (52, 51932), (63, 51770), (64, 51758), (70, 51731), (82, 51608),

Gene: Bluephacebaby\_59 Start: 52729, Stop: 52118, Start Num: 19

Candidate Starts for Bluephacebaby\_59:

(16, 52795), (Start: 18 @52741 has 3 MA's), (Start: 19 @52729 has 15 MA's), (23, 52702), (Start: 27 @52684 has 1 MA's), (32, 52630), (36, 52597), (42, 52564), (52, 52474), (63, 52312), (64, 52300), (70, 52273), (82, 52150),

Gene: BobbyK\_53 Start: 52148, Stop: 51396, Start Num: 4

Candidate Starts for BobbyK\_53:

(Start: 4 @52148 has 21 MA's), (8, 52124), (14, 51983), (49, 51746), (51, 51719), (54, 51701), (65, 51563), (66, 51560), (71, 51530), (74, 51518), (76, 51509), (77, 51503), (81, 51452),

Gene: BrownCNA\_54 Start: 52490, Stop: 51693, Start Num: 4

Candidate Starts for BrownCNA\_54:

(Start: 4 @52490 has 21 MA's), (8, 52466), (14, 52331), (17, 52280), (24, 52205), (49, 52043), (51, 52016), (54, 51998), (65, 51860), (66, 51857), (71, 51827), (74, 51815), (77, 51800), (81, 51749),

Gene: CRB2\_56 Start: 53718, Stop: 53233, Start Num: 33

Candidate Starts for CRB2\_56:

(20, 53814), (Start: 33 @53718 has 2 MA's), (36, 53694), (58, 53499), (64, 53412), (74, 53355),

Gene: CamL\_59 Start: 52494, Stop: 51883, Start Num: 19

Candidate Starts for CamL\_59:

(16, 52560), (Start: 18 @52506 has 3 MA's), (Start: 19 @52494 has 15 MA's), (23, 52467), (Start: 27 @52449 has 1 MA's), (32, 52395), (36, 52362), (42, 52329), (52, 52239), (63, 52077), (64, 52065), (70, 52038), (82, 51915),

Gene: ChrisnMich\_52 Start: 51144, Stop: 50398, Start Num: 4

Candidate Starts for ChrisnMich\_52:

(Start: 4 @51144 has 21 MA's), (8, 51120), (14, 50985), (47, 50772), (49, 50748), (51, 50721), (54, 50703), (60, 50637), (61, 50616), (65, 50565), (66, 50562), (71, 50532), (74, 50520), (76, 50511), (77, 50505), (81, 50454),

Gene: Cooper\_53 Start: 51371, Stop: 50706, Start Num: 5

Candidate Starts for Cooper\_53:

(Start: 5 @51371 has 1 MA's), (14, 51209), (37, 51119), (54, 50999), (64, 50885), (71, 50840), (74, 50828), (77, 50813), (81, 50762),

Gene: Dice\_58 Start: 52160, Stop: 51549, Start Num: 19

Candidate Starts for Dice\_58:

(16, 52226), (Start: 18 @52172 has 3 MA's), (Start: 19 @52160 has 15 MA's), (23, 52133), (Start: 27 @52115 has 1 MA's), (32, 52061), (36, 52028), (42, 51995), (52, 51905), (63, 51743), (64, 51731), (70, 51704), (71, 51689), (82, 51581),

Gene: DigitDog\_57 Start: 52573, Stop: 51959, Start Num: 11

Candidate Starts for DigitDog\_57:

(Start: 11 @52573 has 1 MA's), (21, 52462), (25, 52456), (40, 52393), (41, 52384), (47, 52354), (55, 52282), (66, 52135), (69, 52120), (73, 52078),

Gene: EastView9101\_56 Start: 52507, Stop: 51881, Start Num: 6

Candidate Starts for EastView9101\_56:

(Start: 6 @52507 has 7 MA's), (Start: 22 @52390 has 1 MA's), (44, 52288), (55, 52198), (66, 52060), (74, 52018),

Gene: Epah\_51 Start: 51163, Stop: 50471, Start Num: 4

Candidate Starts for Epah\_51:

(Start: 4 @51163 has 21 MA's), (8, 51139), (14, 51004), (47, 50845), (49, 50821), (51, 50794), (54, 50776), (60, 50710), (61, 50689), (65, 50638), (66, 50635), (71, 50605), (74, 50593), (76, 50584), (77, 50578), (81, 50527),

Gene: Fanaw\_51 Start: 51919, Stop: 51119, Start Num: 4

Candidate Starts for Fanaw\_51:

(Start: 4 @51919 has 21 MA's), (8, 51895), (14, 51760), (17, 51709), (24, 51631), (39, 51538), (49, 51469), (53, 51433), (54, 51424), (59, 51361), (60, 51358), (65, 51286), (66, 51283), (74, 51241), (77, 51226), (81, 51175),

Gene: Fortunato\_53 Start: 52173, Stop: 51481, Start Num: 4

Candidate Starts for Fortunato\_53:

(Start: 4 @52173 has 21 MA's), (8, 52149), (14, 52014), (47, 51855), (49, 51831), (51, 51804), (54, 51786), (60, 51720), (61, 51699), (65, 51648), (66, 51645), (71, 51615), (74, 51603), (76, 51594), (77, 51588), (81, 51537),

Gene: Frederick\_53 Start: 52088, Stop: 51396, Start Num: 4

Candidate Starts for Frederick\_53:

(Start: 4 @52088 has 21 MA's), (8, 52064), (14, 51929), (47, 51770), (51, 51719), (54, 51701), (60, 51635), (61, 51614), (65, 51563), (66, 51560), (71, 51530), (74, 51518), (76, 51509), (77, 51503), (81, 51452),

Gene: FremontTroll\_60 Start: 52788, Stop: 52177, Start Num: 19

Candidate Starts for FremontTroll\_60:

(16, 52854), (Start: 18 @52800 has 3 MA's), (Start: 19 @52788 has 15 MA's), (23, 52761), (Start: 27 @52743 has 1 MA's), (32, 52689), (36, 52656), (42, 52623), (52, 52533), (63, 52371), (64, 52359), (70, 52332), (82, 52209),

Gene: GinPorsche\_52 Start: 51163, Stop: 50471, Start Num: 4

Candidate Starts for GinPorsche\_52:

(Start: 4 @51163 has 21 MA's), (8, 51139), (14, 51004), (47, 50845), (49, 50821), (51, 50794), (54, 50776), (60, 50710), (61, 50689), (65, 50638), (66, 50635), (71, 50605), (74, 50593), (76, 50584), (77, 50578), (81, 50527),

Gene: Hally898\_51 Start: 51178, Stop: 50486, Start Num: 4

Candidate Starts for Hally898\_51:

(Start: 4 @51178 has 21 MA's), (8, 51154), (14, 51019), (47, 50860), (49, 50836), (51, 50809), (54, 50791), (60, 50725), (61, 50704), (65, 50653), (66, 50650), (71, 50620), (74, 50608), (76, 50599), (77, 50593), (81, 50542),

Gene: Hangman\_52 Start: 52233, Stop: 51475, Start Num: 4

Candidate Starts for Hangman\_52:

(Start: 4 @52233 has 21 MA's), (8, 52209), (14, 52062), (49, 51825), (51, 51798), (54, 51780), (65, 51642), (66, 51639), (71, 51609), (74, 51597), (76, 51588), (77, 51582), (81, 51531),

Gene: Heath\_51 Start: 51844, Stop: 51098, Start Num: 4

Candidate Starts for Heath\_51:

(Start: 4 @51844 has 21 MA's), (8, 51820), (14, 51685), (29, 51568), (47, 51472), (49, 51448), (51, 51421), (54, 51403), (60, 51337), (61, 51316), (65, 51265), (66, 51262), (71, 51232), (74, 51220), (76, 51211), (77, 51205), (81, 51154),

Gene: Hydro\_52 Start: 52225, Stop: 51479, Start Num: 4

Candidate Starts for Hydro\_52:

(Start: 4 @52225 has 21 MA's), (8, 52201), (14, 52066), (47, 51853), (49, 51829), (51, 51802), (54, 51784), (60, 51718), (61, 51697), (65, 51646), (66, 51643), (71, 51613), (74, 51601), (76, 51592), (77, 51586), (81, 51535),

Gene: JAMaL\_52 Start: 52342, Stop: 51650, Start Num: 4

Candidate Starts for JAMaL\_52:

(Start: 4 @52342 has 21 MA's), (8, 52318), (14, 52183), (46, 52030), (49, 52000), (51, 51973), (54, 51955), (60, 51889), (61, 51868), (65, 51817), (66, 51814), (71, 51784), (74, 51772), (76, 51763), (77, 51757), (81, 51706),

Gene: JaguarMi\_54 Start: 53280, Stop: 52573, Start Num: 4

Candidate Starts for JaguarMi\_54:

(Start: 4 @53280 has 21 MA's), (8, 53256), (14, 53121), (48, 52950), (49, 52938), (53, 52902), (54, 52893), (60, 52812), (65, 52740), (66, 52737), (71, 52707), (74, 52695), (76, 52686), (77, 52680), (81, 52629),

Gene: Jesabah\_60 Start: 52768, Stop: 52139, Start Num: 18

Candidate Starts for Jesabah\_60:

(Start: 18 @52768 has 3 MA's), (23, 52723), (Start: 27 @52705 has 1 MA's), (32, 52651), (36, 52618), (42, 52585), (52, 52495), (63, 52333), (64, 52321), (70, 52294), (71, 52279), (82, 52171),

Gene: JoyceMaria\_52 Start: 52113, Stop: 51367, Start Num: 4

Candidate Starts for JoyceMaria\_52:

(Start: 4 @52113 has 21 MA's), (8, 52089), (14, 51954), (49, 51717), (51, 51690), (54, 51672), (65, 51534), (66, 51531), (71, 51501), (74, 51489), (76, 51480), (77, 51474), (81, 51423),

Gene: KarasumaRum\_57 Start: 52746, Stop: 52102, Start Num: 11

Candidate Starts for KarasumaRum\_57:

(Start: 11 @52746 has 1 MA's), (Start: 22 @52632 has 1 MA's), (41, 52551), (43, 52548), (45, 52530), (47, 52521), (55, 52425), (66, 52278), (73, 52221),

Gene: Kimbrough\_60 Start: 52742, Stop: 52131, Start Num: 19

Candidate Starts for Kimbrough\_60:

(16, 52808), (Start: 18 @52754 has 3 MA's), (Start: 19 @52742 has 15 MA's), (23, 52715), (Start: 27 @52697 has 1 MA's), (32, 52643), (36, 52610), (42, 52577), (52, 52487), (63, 52325), (64, 52313), (70, 52286), (82, 52163),

Gene: Lambano\_51 Start: 51178, Stop: 50486, Start Num: 4

Candidate Starts for Lambano\_51:

(Start: 4 @51178 has 21 MA's), (8, 51154), (14, 51019), (47, 50860), (49, 50836), (51, 50809), (54, 50791), (60, 50725), (61, 50704), (65, 50653), (66, 50650), (71, 50620), (74, 50608), (76, 50599), (77, 50593), (81, 50542),

Gene: Lego3393\_58 Start: 52733, Stop: 52122, Start Num: 19

Candidate Starts for Lego3393\_58:

(16, 52799), (Start: 18 @52745 has 3 MA's), (Start: 19 @52733 has 15 MA's), (23, 52706), (Start: 27 @52688 has 1 MA's), (32, 52634), (36, 52601), (42, 52568), (52, 52478), (63, 52316), (64, 52304), (70, 52277), (82, 52154),

Gene: LittleDigger\_51 Start: 51191, Stop: 50499, Start Num: 4

Candidate Starts for LittleDigger\_51:

(Start: 4 @51191 has 21 MA's), (8, 51167), (14, 51032), (37, 50924), (47, 50873), (49, 50849), (51, 50822), (54, 50804), (60, 50738), (61, 50717), (65, 50666), (66, 50663), (71, 50633), (74, 50621), (76, 50612), (77, 50606), (81, 50555),

Gene: Lolalove\_53 Start: 52193, Stop: 51447, Start Num: 4

Candidate Starts for Lolalove\_53:

(Start: 4 @52193 has 21 MA's), (8, 52169), (14, 52034), (47, 51821), (49, 51797), (51, 51770), (54, 51752), (60, 51686), (61, 51665), (65, 51614), (66, 51611), (71, 51581), (74, 51569), (76, 51560), (77, 51554), (81, 51503),

Gene: Magpie\_51 Start: 52088, Stop: 51300, Start Num: 4

Candidate Starts for Magpie\_51:

(Start: 4 @52088 has 21 MA's), (8, 52064), (14, 51929), (17, 51890), (24, 51812), (47, 51674), (49, 51650), (51, 51623), (54, 51605), (60, 51539), (61, 51518), (65, 51467), (66, 51464), (71, 51434), (74, 51422), (76, 51413), (81, 51356),

Gene: Mecca\_59 Start: 52730, Stop: 52119, Start Num: 19

Candidate Starts for Mecca\_59:

(16, 52796), (Start: 18 @52742 has 3 MA's), (Start: 19 @52730 has 15 MA's), (23, 52703), (Start: 27 @52685 has 1 MA's), (32, 52631), (36, 52598), (42, 52565), (52, 52475), (63, 52313), (64, 52301), (70, 52274), (82, 52151),

Gene: Mesmerelda\_58 Start: 52199, Stop: 51570, Start Num: 18

Candidate Starts for Mesmerelda\_58:

(Start: 18 @52199 has 3 MA's), (23, 52154), (Start: 27 @52136 has 1 MA's), (32, 52082), (36, 52049), (42, 52016), (52, 51926), (63, 51764), (64, 51752), (70, 51725), (71, 51710), (82, 51602),

Gene: Mithril\_52 Start: 52185, Stop: 51439, Start Num: 4

Candidate Starts for Mithril\_52:

(Start: 4 @52185 has 21 MA's), (8, 52161), (14, 52026), (39, 51858), (49, 51789), (51, 51762), (54, 51744), (65, 51606), (66, 51603), (71, 51573), (74, 51561), (76, 51552), (77, 51546), (81, 51495),

Gene: Mudslide\_52 Start: 52443, Stop: 51697, Start Num: 4

Candidate Starts for Mudslide\_52:

(Start: 4 @52443 has 21 MA's), (8, 52419), (14, 52284), (37, 52122), (47, 52071), (49, 52047), (51, 52020), (54, 52002), (60, 51936), (61, 51915), (65, 51864), (66, 51861), (71, 51831), (74, 51819), (76, 51810), (77, 51804), (81, 51753),

Gene: Mysterious\_55 Start: 52741, Stop: 52097, Start Num: 6

Candidate Starts for Mysterious\_55:

(Start: 6 @52741 has 7 MA's), (Start: 22 @52615 has 1 MA's), (50, 52447), (55, 52423), (66, 52273), (69, 52258), (73, 52216),

Gene: Nanao\_51 Start: 51168, Stop: 50476, Start Num: 4

Candidate Starts for Nanao\_51:

(Start: 4 @51168 has 21 MA's), (8, 51144), (14, 51009), (47, 50850), (49, 50826), (51, 50799), (54, 50781), (60, 50715), (61, 50694), (65, 50643), (66, 50640), (71, 50610), (74, 50598), (76, 50589), (77, 50583), (81, 50532),

Gene: Nangang\_57 Start: 52928, Stop: 52311, Start Num: 11

Candidate Starts for Nangang\_57:

(Start: 11 @52928 has 1 MA's), (21, 52817), (25, 52811), (40, 52748), (41, 52739), (55, 52637), (66, 52487), (73, 52430),

Gene: Nehemiah\_56 Start: 52741, Stop: 52097, Start Num: 6

Candidate Starts for Nehemiah\_56:

(Start: 6 @52741 has 7 MA's), (Start: 22 @52615 has 1 MA's), (50, 52447), (55, 52423), (66, 52273), (69, 52258), (73, 52216),

Gene: Nyala\_58 Start: 52175, Stop: 51564, Start Num: 19

Candidate Starts for Nyala\_58:

(16, 52241), (Start: 18 @52187 has 3 MA's), (Start: 19 @52175 has 15 MA's), (23, 52148), (Start: 27 @52130 has 1 MA's), (32, 52076), (36, 52043), (42, 52010), (52, 51920), (63, 51758), (64, 51746), (70, 51719), (71, 51704), (82, 51596),

Gene: Olak\_58 Start: 52178, Stop: 51567, Start Num: 19

Candidate Starts for Olak\_58:

(16, 52244), (Start: 18 @52190 has 3 MA's), (Start: 19 @52178 has 15 MA's), (23, 52151), (Start: 27 @52133 has 1 MA's), (32, 52079), (36, 52046), (42, 52013), (52, 51923), (63, 51761), (64, 51749), (70, 51722), (71, 51707), (82, 51599),

Gene: Omniscient\_60 Start: 53038, Stop: 52427, Start Num: 19

Candidate Starts for Omniscient\_60:

(16, 53104), (Start: 18 @53050 has 3 MA's), (Start: 19 @53038 has 15 MA's), (23, 53011), (Start: 27 @52993 has 1 MA's), (32, 52939), (36, 52906), (42, 52873), (52, 52783), (63, 52621), (64, 52609), (70, 52582), (82, 52459),

Gene: Phelemich\_55 Start: 52737, Stop: 52096, Start Num: 6

Candidate Starts for Phelemich\_55:

(Start: 6 @52737 has 7 MA's), (Start: 22 @52611 has 1 MA's), (31, 52566), (50, 52443), (51, 52440), (55, 52419), (66, 52272), (68, 52260), (73, 52215),

Gene: Poster\_51 Start: 51169, Stop: 50477, Start Num: 4

Candidate Starts for Poster\_51:

(Start: 4 @51169 has 21 MA's), (8, 51145), (14, 51010), (47, 50851), (49, 50827), (51, 50800), (54, 50782), (60, 50716), (61, 50695), (65, 50644), (66, 50641), (71, 50611), (74, 50599), (76, 50590), (77, 50584), (81, 50533),

Gene: Prince\_52 Start: 52350, Stop: 51604, Start Num: 4

Candidate Starts for Prince\_52:

(Start: 4 @52350 has 21 MA's), (8, 52326), (14, 52191), (37, 52029), (47, 51978), (49, 51954), (51, 51927), (54, 51909), (60, 51843), (61, 51822), (65, 51771), (66, 51768), (71, 51738), (74, 51726), (76, 51717), (77, 51711), (81, 51660),

Gene: ProfessorX\_59 Start: 52187, Stop: 51576, Start Num: 19

Candidate Starts for ProfessorX\_59:

(16, 52253), (Start: 18 @52199 has 3 MA's), (Start: 19 @52187 has 15 MA's), (23, 52160), (Start: 27 @52142 has 1 MA's), (32, 52088), (36, 52055), (42, 52022), (52, 51932), (63, 51770), (64, 51758), (70, 51731), (82, 51608),

Gene: QueenBeane\_59 Start: 52449, Stop: 51883, Start Num: 27

Candidate Starts for QueenBeane\_59:

(16, 52560), (Start: 18 @52506 has 3 MA's), (Start: 19 @52494 has 15 MA's), (23, 52467), (Start: 27 @52449 has 1 MA's), (32, 52395), (36, 52362), (42, 52329), (52, 52239), (63, 52077), (64, 52065), (70, 52038), (82, 51915),

Gene: QueenPie\_50 Start: 51863, Stop: 51195, Start Num: 4

Candidate Starts for QueenPie\_50:

(Start: 3 @51875 has 1 MA's), (Start: 4 @51863 has 21 MA's), (14, 51719), (37, 51620), (47, 51569), (51, 51518), (54, 51500), (60, 51434), (61, 51413), (65, 51362), (66, 51359), (71, 51329), (74, 51317), (76, 51308), (77, 51302), (81, 51251),

Gene: RawrgerThat\_53 Start: 52205, Stop: 51513, Start Num: 4

Candidate Starts for RawrgerThat\_53:

(Start: 4 @52205 has 21 MA's), (8, 52181), (14, 52046), (47, 51887), (51, 51836), (54, 51818), (60, 51752), (61, 51731), (65, 51680), (66, 51677), (71, 51647), (74, 51635), (76, 51626), (77, 51620), (81, 51569),

Gene: Renkei\_51 Start: 51185, Stop: 50493, Start Num: 4

Candidate Starts for Renkei\_51:

(Start: 4 @51185 has 21 MA's), (8, 51161), (14, 51026), (37, 50918), (47, 50867), (49, 50843), (51, 50816), (54, 50798), (60, 50732), (61, 50711), (65, 50660), (66, 50657), (71, 50627), (74, 50615), (76, 50606), (77, 50600), (81, 50549),

Gene: Reprobate\_56 Start: 52742, Stop: 52101, Start Num: 6

Candidate Starts for Reprobate\_56:

(Start: 6 @52742 has 7 MA's), (Start: 22 @52616 has 1 MA's), (31, 52571), (50, 52448), (51, 52445), (55, 52424), (66, 52277), (68, 52265), (73, 52220),

Gene: Rich\_57 Start: 53862, Stop: 53494, Start Num: 22

Candidate Starts for Rich\_57:

(Start: 6 @53979 has 7 MA's), (21, 53865), (Start: 22 @53862 has 1 MA's), (55, 53793), (65, 53658), (74, 53613),

Gene: Rinke\_55 Start: 52581, Stop: 52141, Start Num: 33

Candidate Starts for Rinke\_55:

(Start: 33 @52581 has 2 MA's), (57, 52422), (70, 52290), (72, 52269), (75, 52260), (79, 52206), (80, 52200),

Gene: Samaymay\_59 Start: 52494, Stop: 51883, Start Num: 19

Candidate Starts for Samaymay\_59:

(16, 52560), (Start: 18 @52506 has 3 MA's), (Start: 19 @52494 has 15 MA's), (23, 52467), (Start: 27 @52449 has 1 MA's), (32, 52395), (36, 52362), (42, 52329), (52, 52239), (63, 52077), (64, 52065), (70, 52038), (82, 51915),

Gene: Selr12\_60 Start: 52203, Stop: 51592, Start Num: 19

Candidate Starts for Selr12\_60:

(16, 52269), (Start: 18 @52215 has 3 MA's), (Start: 19 @52203 has 15 MA's), (23, 52176), (Start: 27 @52158 has 1 MA's), (32, 52104), (36, 52071), (42, 52038), (52, 51948), (63, 51786), (64, 51774), (70, 51747), (71, 51732), (82, 51624),

Gene: Serendipitous\_55 Start: 51901, Stop: 51308, Start Num: 6

Candidate Starts for Serendipitous\_55:

(Start: 6 @51901 has 7 MA's), (9, 51865), (Start: 22 @51808 has 1 MA's), (31, 51763), (51, 51637), (61, 51532), (62, 51514), (66, 51478), (71, 51448), (81, 51370),

Gene: Shenyu\_57 Start: 52961, Stop: 52323, Start Num: 11

Candidate Starts for Shenyu\_57:

(10, 52985), (Start: 11 @52961 has 1 MA's), (Start: 22 @52844 has 1 MA's), (30, 52802), (40, 52757), (44, 52736), (55, 52646), (66, 52499), (73, 52442),

Gene: ShiVal\_57 Start: 52198, Stop: 51587, Start Num: 19

Candidate Starts for ShiVal\_57:

(16, 52264), (Start: 18 @52210 has 3 MA's), (Start: 19 @52198 has 15 MA's), (23, 52171), (Start: 27 @52153 has 1 MA's), (32, 52099), (36, 52066), (42, 52033), (52, 51943), (63, 51781), (64, 51769), (70, 51742), (71, 51727), (82, 51619),

Gene: SirJeffery\_56 Start: 52558, Stop: 51962, Start Num: 12

Candidate Starts for SirJeffery\_56:

(Start: 6 @52672 has 7 MA's), (12, 52558), (55, 52279), (66, 52138), (73, 52081),

Gene: Stinger\_52 Start: 50893, Stop: 50213, Start Num: 3

Candidate Starts for Stinger\_52:

(1, 51100), (2, 50905), (Start: 3 @50893 has 1 MA's), (8, 50854), (14, 50725), (37, 50638), (41, 50614), (49, 50563), (54, 50518), (65, 50380), (66, 50377), (71, 50347), (74, 50335), (76, 50326), (77, 50320), (81, 50269),

Gene: StinkyVeggy\_57 Start: 52746, Stop: 52102, Start Num: 11

Candidate Starts for StinkyVeggy\_57:

(Start: 11 @52746 has 1 MA's), (Start: 22 @52632 has 1 MA's), (41, 52551), (43, 52548), (45, 52530), (47, 52521), (55, 52425), (66, 52278), (73, 52221),

Gene: Suigeneris\_58 Start: 52838, Stop: 52212, Start Num: 6

Candidate Starts for Suigeneris\_58:

(Start: 6 @52838 has 7 MA's), (Start: 22 @52721 has 1 MA's), (44, 52619), (55, 52529), (66, 52388), (73, 52331),

Gene: Tomlarah\_60 Start: 53022, Stop: 52411, Start Num: 19

Candidate Starts for Tomlarah\_60:

(16, 53088), (Start: 18 @53034 has 3 MA's), (Start: 19 @53022 has 15 MA's), (23, 52995), (Start: 27 @52977 has 1 MA's), (32, 52923), (36, 52890), (42, 52857), (52, 52767), (63, 52605), (64, 52593), (70, 52566), (71, 52551), (82, 52443),

Gene: Vaticameos\_56 Start: 50713, Stop: 50102, Start Num: 19

Candidate Starts for Vaticameos\_56:

(16, 50779), (Start: 18 @50725 has 3 MA's), (Start: 19 @50713 has 15 MA's), (23, 50686), (Start: 27 @50668 has 1 MA's), (32, 50614), (36, 50581), (42, 50548), (52, 50458), (63, 50296), (64, 50284), (70, 50257), (71, 50242), (82, 50134),

Gene: Vincenzo\_54 Start: 53132, Stop: 52305, Start Num: 7

Candidate Starts for Vincenzo\_54:

(Start: 7 @53132 has 2 MA's), (8, 53126), (13, 52991), (15, 52958), (24, 52850), (28, 52808), (34, 52772), (35, 52757), (51, 52646), (53, 52634), (56, 52604), (58, 52568), (66, 52469), (71, 52439), (74, 52427), (75, 52424), (78, 52397), (80, 52364),

Gene: VioletZ\_54 Start: 52269, Stop: 51523, Start Num: 4

Candidate Starts for VioletZ\_54:

(Start: 4 @52269 has 21 MA's), (8, 52245), (14, 52110), (39, 51942), (49, 51873), (51, 51846), (54, 51828), (65, 51690), (66, 51687), (71, 51657), (74, 51645), (76, 51636), (77, 51630), (81, 51579),

Gene: Waleliano\_52 Start: 52222, Stop: 51425, Start Num: 4

Candidate Starts for Waleliano\_52:

(Start: 4 @52222 has 21 MA's), (8, 52198), (14, 52063), (17, 52012), (24, 51937), (49, 51775), (51, 51748), (54, 51730), (65, 51592), (66, 51589), (71, 51559), (74, 51547), (77, 51532), (81, 51481),

Gene: Xincheng\_53 Start: 53256, Stop: 52549, Start Num: 4

Candidate Starts for Xincheng\_53:

(Start: 4 @53256 has 21 MA's), (8, 53232), (14, 53097), (48, 52926), (49, 52914), (53, 52878), (54, 52869), (60, 52788), (65, 52716), (66, 52713), (71, 52683), (74, 52671), (76, 52662), (77, 52656), (81, 52605),

Gene: Zemanar\_53 Start: 52057, Stop: 51395, Start Num: 4

Candidate Starts for Zemanar\_53:

(Start: 4 @52057 has 21 MA's), (14, 51910), (37, 51820), (39, 51814), (60, 51634), (61, 51613), (65, 51562), (66, 51559), (67, 51556), (71, 51529), (74, 51517), (81, 51451),