



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 311496 Report

This analysis was run 06/27/26 on database version 652.

Pham number 311496 has 83 members, 10 are drafts.

Phages represented in each track:

- Track 1 : LilMoolah\_61, Che8\_68, Job42\_65, James\_67, Coco12\_62, Mattes\_67, BuzzLyseyear\_69, Lizziana\_69, Velveteen\_58, Nivrat\_59, GUmbie\_61, Brookers\_60, BigPhil\_59, Eradicator\_56, Philus\_66, Cerasum\_59, Saal\_65, DRBy19\_66, Tchotchke\_62, Yorick\_62, IbOuu\_62, Kingsley\_60, Guppsters\_63, Gorge\_67, OlympiaSaint\_65, Sarma624\_61
- Track 2 : DaddyRickover\_62, RedBird\_61, Dorothy\_61, Sassafras\_61, Aubs\_63
- Track 3 : BlueCrab\_63, ByChance\_55
- Track 4 : Grimmer\_73
- Track 5 : Firehouse51\_64, Mutaforma13\_67
- Track 6 : LunaBlu\_65, Galactic\_62, Ihubesi\_63, Polo2Bam\_69, SeaLumen\_68, NewHope4\_64, Enzomatic\_70
- Track 7 : Estave1\_66, Juniper1\_62
- Track 8 : Oksu\_67
- Track 9 : Phasih\_61
- Track 10 : Mahavrat\_60
- Track 11 : Inventum\_58
- Track 12 : Pollywog\_64, Royals2015\_66
- Track 13 : GigiOuiOui\_59, Soul22\_69
- Track 14 : Marker\_65, Topiatin\_70
- Track 15 : Madiba\_64, Mova\_67
- Track 16 : Kimberlium\_68, MulchExplorer\_67, QuickMath\_67
- Track 17 : Beanstalk\_62
- Track 18 : Harley\_65
- Track 19 : Fancypants\_65
- Track 20 : Latretium\_65
- Track 21 : MadMen\_63
- Track 22 : SimranZ1\_64
- Track 23 : Cornucopia\_65
- Track 24 : Yoshi\_78, ThetaBob\_70
- Track 25 : Avani\_71
- Track 26 : Che9d\_72
- Track 27 : Renaud18\_73
- Track 28 : Bobby\_77, Hidrated\_71
- Track 29 : Wanda\_95, Xiaokay\_80, Klein\_91, Constella\_76, Zelink\_88
- Track 30 : Thibault\_75
- Track 31 : Rebel\_53
- Track 32 : Phayonce\_58

- Track 33 : MooMoo\_50

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

The start number called the most often in the published annotations is 20, it was called in 69 of the 73 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aubs\_63, Avani\_71, Beanstalk\_62, BigPhil\_59, BlueCrab\_63, Bobby\_77, Brookers\_60, BuzzLyseyear\_69, ByChance\_55, Cerasum\_59, Che8\_68, Coco12\_62, Constella\_76, Cornucopia\_65, DRBy19\_66, DaddyRickover\_62, Dorothy\_61, Enzomatic\_70, Eradicator\_56, Estave1\_66, Fancypants\_65, Firehouse51\_64, GUmble\_61, Galactic\_62, GigiOuiOui\_59, Gorge\_67, Grimmer\_73, Guppsters\_63, Harley\_65, Hidrated\_71, IbOuu\_62, Ibhubesi\_63, James\_67, Job42\_65, Juniper1\_62, Kimberlium\_68, Kingsley\_60, Klein\_91, Latretium\_65, LilMoolah\_61, Lizziana\_69, LunaBlu\_65, MadMen\_63, Madiba\_64, Mahavrat\_60, Marker\_65, Mattes\_67, MooMoo\_50, Mova\_67, MulchExplorer\_67, Mutaforma13\_67, NewHope4\_64, Nivrat\_59, Oksu\_67, OlympiaSaint\_65, Phayonce\_58, Philus\_66, Pollywog\_64, Polo2Bam\_69, QuickMath\_67, Rebel\_53, RedBird\_61, Renaud18\_73, Royals2015\_66, Saal\_65, Sarma624\_61, Sassafras\_61, SeaLumen\_68, Soul22\_69, Tchotchke\_62, ThetaBob\_70, Thibault\_75, Topiatin\_70, Velveteen\_58, Wanda\_95, Xiaokay\_80, Yorick\_62, Yoshi\_78, Zelink\_88,

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

- Inventum\_58, Phasih\_61,

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

- Che9d\_72, SimranZ1\_64,

**Summary by start number:**

Start 17:

- Found in 2 of 83 ( 2.4% ) of genes in pham
- Manual Annotations of this start: 2 of 73
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Che9d\_72 (F2), SimranZ1\_64 (F1),

Start 18:

- Found in 60 of 83 ( 72.3% ) of genes in pham
- Manual Annotations of this start: 1 of 73
- Called 1.7% of time when present
- Phage (with cluster) where this start called: Inventum\_58 (F1),

Start 20:

- Found in 81 of 83 ( 97.6% ) of genes in pham
- Manual Annotations of this start: 69 of 73
- Called 97.5% of time when present
- Phage (with cluster) where this start called: Aubs\_63 (F1), Avani\_71 (F2), Beanstalk\_62 (F1), BigPhil\_59 (F1), BlueCrab\_63 (F1), Bobby\_77 (J), Brookers\_60 (F1), BuzzLyseyear\_69 (F1), ByChance\_55 (F1), Cerasum\_59 (F1), Che8\_68 (F1),

Coco12\_62 (F1), Constella\_76 (J), Cornucopia\_65 (F1), DRBy19\_66 (F1), DaddyRickover\_62 (F1), Dorothy\_61 (F1), Enzomatic\_70 (F1), Eradicator\_56 (F1), Estave1\_66 (F1), Fancypants\_65 (F1), Firehouse51\_64 (F1), GUmbie\_61 (F1), Galactic\_62 (F1), GigiOuiOui\_59 (F1), Gorge\_67 (F1), Grimmer\_73 (F1), Guppsters\_63 (F1), Harley\_65 (F1), Hidrated\_71 (J), IbOuu\_62 (F1), Ibhubesi\_63 (F1), James\_67 (F1), Job42\_65 (F1), Juniper1\_62 (F1), Kimberlium\_68 (F1), Kingsley\_60 (F1), Klein\_91 (J), Latretium\_65 (F1), LilMoolah\_61 (F1), Lizziana\_69 (F1), LunaBlu\_65 (F1), MadMen\_63 (F1), Madiba\_64 (F1), Mahavrat\_60 (F1), Marker\_65 (F1), Mattes\_67 (F1), MooMoo\_50 (singleton), Mova\_67 (F1), MulchExplorer\_67 (F1), Mutaforma13\_67 (F1), NewHope4\_64 (F1), Nivrat\_59 (F1), Oksu\_67 (F1), OlympiaSaint\_65 (F1), Phayonce\_58 (P5), Philus\_66 (F1), Pollywog\_64 (F1), Polo2Bam\_69 (F1), QuickMath\_67 (F1), Rebel\_53 (N), RedBird\_61 (F1), Renaud18\_73 (F4), Royals2015\_66 (F1), Saal\_65 (F1), Sarma624\_61 (F1), Sassafra\_61 (F1), SeaLumen\_68 (F1), Soul22\_69 (F2), Tchotchke\_62 (F1), ThetaBob\_70 (F4), Thibault\_75 (J), Topiatin\_70 (F1), Velveteen\_58 (F1), Wanda\_95 (J), Xiaokay\_80 (J), Yorick\_62 (F1), Yoshi\_78 (F2), Zelink\_88 (J),

Start 21:

- Found in 1 of 83 ( 1.2% ) of genes in pham
- Manual Annotations of this start: 1 of 73
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Phasih\_61 (F1),

### **Summary by clusters:**

There are 7 clusters represented in this pham: F1, singleton, F4, P5, J, F2, N,

Info for manual annotations of cluster F1:

- Start number 17 was manually annotated 1 time for cluster F1.
- Start number 18 was manually annotated 1 time for cluster F1.
- Start number 20 was manually annotated 55 times for cluster F1.
- Start number 21 was manually annotated 1 time for cluster F1.

Info for manual annotations of cluster F2:

- Start number 17 was manually annotated 1 time for cluster F2.
- Start number 20 was manually annotated 3 times for cluster F2.

Info for manual annotations of cluster F4:

- Start number 20 was manually annotated 2 times for cluster F4.

Info for manual annotations of cluster J:

- Start number 20 was manually annotated 6 times for cluster J.

Info for manual annotations of cluster N:

- Start number 20 was manually annotated 1 time for cluster N.

Info for manual annotations of cluster P5:

- Start number 20 was manually annotated 1 time for cluster P5.

### **Gene Information:**

Gene: Aubs\_63 Start: 41384, Stop: 41719, Start Num: 20  
Candidate Starts for Aubs\_63:  
(Start: 18 @41375 has 1 MA's), (Start: 20 @41384 has 69 MA's), (25, 41423), (33, 41495), (59, 41708),

Gene: Avani\_71 Start: 41759, Stop: 42094, Start Num: 20  
Candidate Starts for Avani\_71:  
(Start: 18 @41750 has 1 MA's), (Start: 20 @41759 has 69 MA's), (25, 41792), (33, 41864), (39, 41912),  
(47, 41999),

Gene: Beanstalk\_62 Start: 39767, Stop: 40108, Start Num: 20  
Candidate Starts for Beanstalk\_62:  
(Start: 18 @39758 has 1 MA's), (Start: 20 @39767 has 69 MA's), (25, 39806), (33, 39884),

Gene: BigPhil\_59 Start: 37375, Stop: 37716, Start Num: 20  
Candidate Starts for BigPhil\_59:  
(Start: 18 @37366 has 1 MA's), (Start: 20 @37375 has 69 MA's), (25, 37414), (33, 37492), (59, 37705),

Gene: BlueCrab\_63 Start: 41722, Stop: 42096, Start Num: 20  
Candidate Starts for BlueCrab\_63:  
(Start: 18 @41713 has 1 MA's), (Start: 20 @41722 has 69 MA's), (22, 41755), (32, 41863), (33, 41866),  
(39, 41914), (47, 42001), (59, 42085),

Gene: Bobby\_77 Start: 51896, Stop: 51546, Start Num: 20  
Candidate Starts for Bobby\_77:  
(16, 51926), (19, 51899), (Start: 20 @51896 has 69 MA's), (29, 51821), (31, 51815), (49, 51644),

Gene: Brookers\_60 Start: 40326, Stop: 40667, Start Num: 20  
Candidate Starts for Brookers\_60:  
(Start: 18 @40317 has 1 MA's), (Start: 20 @40326 has 69 MA's), (25, 40365), (33, 40443), (59, 40656),

Gene: BuzzLyseyear\_69 Start: 42383, Stop: 42724, Start Num: 20  
Candidate Starts for BuzzLyseyear\_69:  
(Start: 18 @42374 has 1 MA's), (Start: 20 @42383 has 69 MA's), (25, 42422), (33, 42500), (59, 42713),

Gene: ByChance\_55 Start: 36650, Stop: 37024, Start Num: 20  
Candidate Starts for ByChance\_55:  
(Start: 18 @36641 has 1 MA's), (Start: 20 @36650 has 69 MA's), (22, 36683), (32, 36791), (33, 36794),  
(39, 36842), (47, 36929), (59, 37013),

Gene: Cerasum\_59 Start: 37393, Stop: 37734, Start Num: 20  
Candidate Starts for Cerasum\_59:  
(Start: 18 @37384 has 1 MA's), (Start: 20 @37393 has 69 MA's), (25, 37432), (33, 37510), (59, 37723),

Gene: Che8\_68 Start: 43879, Stop: 44220, Start Num: 20  
Candidate Starts for Che8\_68:  
(Start: 18 @43870 has 1 MA's), (Start: 20 @43879 has 69 MA's), (25, 43918), (33, 43996), (59, 44209),

Gene: Che9d\_72 Start: 41100, Stop: 41432, Start Num: 17  
Candidate Starts for Che9d\_72:  
(Start: 17 @41100 has 2 MA's), (24, 41130), (25, 41139), (33, 41217), (35, 41241), (37, 41259), (43,  
41313), (48, 41340), (54, 41370), (59, 41421),

Gene: Coco12\_62 Start: 41450, Stop: 41791, Start Num: 20

Candidate Starts for Coco12\_62:

(Start: 18 @41441 has 1 MA's), (Start: 20 @41450 has 69 MA's), (25, 41489), (33, 41567), (59, 41780),

Gene: Constella\_76 Start: 51061, Stop: 51402, Start Num: 20

Candidate Starts for Constella\_76:

(7, 50929), (12, 50989), (14, 51010), (15, 51016), (Start: 20 @51061 has 69 MA's), (25, 51100), (33, 51154), (50, 51316), (51, 51322), (56, 51349), (57, 51352), (59, 51391),

Gene: Cornucopia\_65 Start: 41687, Stop: 42007, Start Num: 20

Candidate Starts for Cornucopia\_65:

(Start: 18 @41678 has 1 MA's), (Start: 20 @41687 has 69 MA's), (25, 41720), (33, 41792), (37, 41834), (43, 41888), (48, 41915), (54, 41945), (59, 41996),

Gene: DRBy19\_66 Start: 42134, Stop: 42475, Start Num: 20

Candidate Starts for DRBy19\_66:

(Start: 18 @42125 has 1 MA's), (Start: 20 @42134 has 69 MA's), (25, 42173), (33, 42251), (59, 42464),

Gene: DaddyRickover\_62 Start: 41176, Stop: 41511, Start Num: 20

Candidate Starts for DaddyRickover\_62:

(Start: 18 @41167 has 1 MA's), (Start: 20 @41176 has 69 MA's), (25, 41215), (33, 41287), (59, 41500),

Gene: Dorothy\_61 Start: 40350, Stop: 40685, Start Num: 20

Candidate Starts for Dorothy\_61:

(Start: 18 @40341 has 1 MA's), (Start: 20 @40350 has 69 MA's), (25, 40389), (33, 40461), (59, 40674),

Gene: Enzomatic\_70 Start: 40804, Stop: 41145, Start Num: 20

Candidate Starts for Enzomatic\_70:

(Start: 18 @40795 has 1 MA's), (Start: 20 @40804 has 69 MA's), (23, 40825), (27, 40840), (30, 40891), (43, 41029), (59, 41134),

Gene: Eradicator\_56 Start: 39233, Stop: 39574, Start Num: 20

Candidate Starts for Eradicator\_56:

(Start: 18 @39224 has 1 MA's), (Start: 20 @39233 has 69 MA's), (25, 39272), (33, 39350), (59, 39563),

Gene: Estave1\_66 Start: 42262, Stop: 42642, Start Num: 20

Candidate Starts for Estave1\_66:

(Start: 18 @42253 has 1 MA's), (Start: 20 @42262 has 69 MA's), (25, 42301), (40, 42472), (42, 42496), (54, 42568), (59, 42631),

Gene: Fancypants\_65 Start: 41674, Stop: 42000, Start Num: 20

Candidate Starts for Fancypants\_65:

(Start: 18 @41665 has 1 MA's), (Start: 20 @41674 has 69 MA's), (25, 41707), (33, 41785), (35, 41809), (37, 41827), (43, 41881), (48, 41908), (54, 41938), (59, 41989),

Gene: Firehouse51\_64 Start: 44558, Stop: 44872, Start Num: 20

Candidate Starts for Firehouse51\_64:

(Start: 18 @44549 has 1 MA's), (Start: 20 @44558 has 69 MA's), (25, 44591), (33, 44663), (43, 44762), (53, 44810), (59, 44861),

Gene: GUmbie\_61 Start: 40460, Stop: 40801, Start Num: 20

Candidate Starts for GUmbie\_61:

(Start: 18 @40451 has 1 MA's), (Start: 20 @40460 has 69 MA's), (25, 40499), (33, 40577), (59, 40790),

Gene: Galactic\_62 Start: 40920, Stop: 41261, Start Num: 20

Candidate Starts for Galactic\_62:

(Start: 18 @40911 has 1 MA's), (Start: 20 @40920 has 69 MA's), (23, 40941), (27, 40956), (30, 41007), (43, 41145), (59, 41250),

Gene: GigiOuiOui\_59 Start: 39900, Stop: 40250, Start Num: 20

Candidate Starts for GigiOuiOui\_59:

(Start: 18 @39891 has 1 MA's), (Start: 20 @39900 has 69 MA's), (25, 39939), (33, 40017), (43, 40131), (46, 40146), (48, 40158),

Gene: Gorge\_67 Start: 42402, Stop: 42743, Start Num: 20

Candidate Starts for Gorge\_67:

(Start: 18 @42393 has 1 MA's), (Start: 20 @42402 has 69 MA's), (25, 42441), (33, 42519), (59, 42732),

Gene: Grimmer\_73 Start: 42556, Stop: 42891, Start Num: 20

Candidate Starts for Grimmer\_73:

(Start: 18 @42547 has 1 MA's), (Start: 20 @42556 has 69 MA's), (25, 42589), (33, 42661), (39, 42709), (47, 42796), (59, 42880),

Gene: Guppsters\_63 Start: 40585, Stop: 40926, Start Num: 20

Candidate Starts for Guppsters\_63:

(Start: 18 @40576 has 1 MA's), (Start: 20 @40585 has 69 MA's), (25, 40624), (33, 40702), (59, 40915),

Gene: Harley\_65 Start: 42034, Stop: 42369, Start Num: 20

Candidate Starts for Harley\_65:

(Start: 18 @42025 has 1 MA's), (Start: 20 @42034 has 69 MA's), (25, 42073),

Gene: Hidrated\_71 Start: 51173, Stop: 50823, Start Num: 20

Candidate Starts for Hidrated\_71:

(16, 51203), (19, 51176), (Start: 20 @51173 has 69 MA's), (29, 51098), (31, 51092), (49, 50921),

Gene: lbOuu\_62 Start: 41437, Stop: 41772, Start Num: 20

Candidate Starts for lbOuu\_62:

(Start: 18 @41428 has 1 MA's), (Start: 20 @41437 has 69 MA's), (25, 41476), (33, 41548), (59, 41761),

Gene: lbhubesi\_63 Start: 41044, Stop: 41385, Start Num: 20

Candidate Starts for lbhubesi\_63:

(Start: 18 @41035 has 1 MA's), (Start: 20 @41044 has 69 MA's), (23, 41065), (27, 41080), (30, 41131), (43, 41269), (59, 41374),

Gene: Inventum\_58 Start: 40539, Stop: 40883, Start Num: 18

Candidate Starts for Inventum\_58:

(Start: 18 @40539 has 1 MA's), (Start: 20 @40548 has 69 MA's), (25, 40587), (33, 40659), (59, 40872),

Gene: James\_67 Start: 42527, Stop: 42868, Start Num: 20

Candidate Starts for James\_67:

(Start: 18 @42518 has 1 MA's), (Start: 20 @42527 has 69 MA's), (25, 42566), (33, 42644), (59, 42857),

Gene: Job42\_65 Start: 42942, Stop: 43283, Start Num: 20

Candidate Starts for Job42\_65:

(Start: 18 @42933 has 1 MA's), (Start: 20 @42942 has 69 MA's), (25, 42981), (33, 43059), (59, 43272),

Gene: Juniper1\_62 Start: 41298, Stop: 41678, Start Num: 20

Candidate Starts for Juniper1\_62:

(Start: 18 @41289 has 1 MA's), (Start: 20 @41298 has 69 MA's), (25, 41337), (40, 41508), (42, 41532), (54, 41604), (59, 41667),

Gene: Kimberlium\_68 Start: 43340, Stop: 43681, Start Num: 20

Candidate Starts for Kimberlium\_68:

(Start: 20 @43340 has 69 MA's), (25, 43379), (33, 43433), (50, 43595), (51, 43601), (56, 43628), (57, 43631),

Gene: Kingsley\_60 Start: 40183, Stop: 40524, Start Num: 20

Candidate Starts for Kingsley\_60:

(Start: 18 @40174 has 1 MA's), (Start: 20 @40183 has 69 MA's), (25, 40222), (33, 40300), (59, 40513),

Gene: Klein\_91 Start: 55893, Stop: 56234, Start Num: 20

Candidate Starts for Klein\_91:

(7, 55761), (12, 55821), (14, 55842), (15, 55848), (Start: 20 @55893 has 69 MA's), (25, 55932), (33, 55986), (50, 56148), (51, 56154), (56, 56181), (57, 56184), (59, 56223),

Gene: Latretium\_65 Start: 41581, Stop: 41904, Start Num: 20

Candidate Starts for Latretium\_65:

(5, 41428), (Start: 18 @41572 has 1 MA's), (Start: 20 @41581 has 69 MA's), (23, 41602), (26, 41617), (30, 41668), (33, 41689), (37, 41731), (43, 41785), (54, 41842), (59, 41893),

Gene: LilMoolah\_61 Start: 40447, Stop: 40788, Start Num: 20

Candidate Starts for LilMoolah\_61:

(Start: 18 @40438 has 1 MA's), (Start: 20 @40447 has 69 MA's), (25, 40486), (33, 40564), (59, 40777),

Gene: Lizziana\_69 Start: 42008, Stop: 42349, Start Num: 20

Candidate Starts for Lizziana\_69:

(Start: 18 @41999 has 1 MA's), (Start: 20 @42008 has 69 MA's), (25, 42047), (33, 42125), (59, 42338),

Gene: LunaBlu\_65 Start: 41579, Stop: 41920, Start Num: 20

Candidate Starts for LunaBlu\_65:

(Start: 18 @41570 has 1 MA's), (Start: 20 @41579 has 69 MA's), (23, 41600), (27, 41615), (30, 41666), (43, 41804), (59, 41909),

Gene: MadMen\_63 Start: 41307, Stop: 41648, Start Num: 20

Candidate Starts for MadMen\_63:

(7, 41175), (12, 41235), (14, 41256), (15, 41262), (Start: 20 @41307 has 69 MA's), (25, 41346), (33, 41400), (50, 41562), (51, 41568), (56, 41595),

Gene: Madiba\_64 Start: 40812, Stop: 41153, Start Num: 20

Candidate Starts for Madiba\_64:

(1, 40572), (2, 40578), (7, 40680), (12, 40740), (14, 40761), (15, 40767), (Start: 20 @40812 has 69 MA's), (25, 40851), (33, 40905), (51, 41073), (56, 41100),

Gene: Mahavrat\_60 Start: 40518, Stop: 40859, Start Num: 20

Candidate Starts for Mahavrat\_60:

(Start: 18 @40509 has 1 MA's), (Start: 20 @40518 has 69 MA's), (25, 40551), (33, 40629), (39, 40677), (47, 40764), (59, 40848),

Gene: Marker\_65 Start: 41128, Stop: 41487, Start Num: 20

Candidate Starts for Marker\_65:

(Start: 18 @41119 has 1 MA's), (Start: 20 @41128 has 69 MA's), (25, 41167), (33, 41239), (50, 41401), (51, 41407), (56, 41434),

Gene: Mattes\_67 Start: 42527, Stop: 42868, Start Num: 20

Candidate Starts for Mattes\_67:

(Start: 18 @42518 has 1 MA's), (Start: 20 @42527 has 69 MA's), (25, 42566), (33, 42644), (59, 42857),

Gene: MooMoo\_50 Start: 36541, Stop: 36855, Start Num: 20

Candidate Starts for MooMoo\_50:

(Start: 20 @36541 has 69 MA's), (28, 36589), (31, 36622), (34, 36661), (36, 36670), (45, 36736), (49, 36763), (58, 36841),

Gene: Mova\_67 Start: 41316, Stop: 41657, Start Num: 20

Candidate Starts for Mova\_67:

(1, 41076), (2, 41082), (7, 41184), (12, 41244), (14, 41265), (15, 41271), (Start: 20 @41316 has 69 MA's), (25, 41355), (33, 41409), (51, 41577), (56, 41604),

Gene: MulchExplorer\_67 Start: 43339, Stop: 43680, Start Num: 20

Candidate Starts for MulchExplorer\_67:

(Start: 20 @43339 has 69 MA's), (25, 43378), (33, 43432), (50, 43594), (51, 43600), (56, 43627), (57, 43630),

Gene: Mutaforma13\_67 Start: 43868, Stop: 44182, Start Num: 20

Candidate Starts for Mutaforma13\_67:

(Start: 18 @43859 has 1 MA's), (Start: 20 @43868 has 69 MA's), (25, 43901), (33, 43973), (43, 44072), (53, 44120), (59, 44171),

Gene: NewHope4\_64 Start: 40950, Stop: 41291, Start Num: 20

Candidate Starts for NewHope4\_64:

(Start: 18 @40941 has 1 MA's), (Start: 20 @40950 has 69 MA's), (23, 40971), (27, 40986), (30, 41037), (43, 41175), (59, 41280),

Gene: Nivrat\_59 Start: 40320, Stop: 40661, Start Num: 20

Candidate Starts for Nivrat\_59:

(Start: 18 @40311 has 1 MA's), (Start: 20 @40320 has 69 MA's), (25, 40359), (33, 40437), (59, 40650),

Gene: Oksu\_67 Start: 43933, Stop: 44274, Start Num: 20

Candidate Starts for Oksu\_67:

(Start: 18 @43924 has 1 MA's), (Start: 20 @43933 has 69 MA's), (25, 43972),

Gene: OlympiaSaint\_65 Start: 41469, Stop: 41810, Start Num: 20

Candidate Starts for OlympiaSaint\_65:

(Start: 18 @41460 has 1 MA's), (Start: 20 @41469 has 69 MA's), (25, 41508), (33, 41586), (59, 41799),

Gene: Phasih\_61 Start: 41374, Stop: 41724, Start Num: 21

Candidate Starts for Phasih\_61:

(Start: 20 @41365 has 69 MA's), (Start: 21 @41374 has 1 MA's), (24, 41395), (25, 41404), (33, 41482), (38, 41527), (41, 41581), (50, 41638), (51, 41644), (56, 41671), (59, 41713),

Gene: Phayonce\_58 Start: 40466, Stop: 40795, Start Num: 20

Candidate Starts for Phayonce\_58:

(3, 40253), (4, 40277), (6, 40334), (8, 40340), (13, 40409), (Start: 20 @40466 has 69 MA's), (28, 40514), (31, 40547), (33, 40565), (59, 40781),

Gene: Philus\_66 Start: 42110, Stop: 42451, Start Num: 20

Candidate Starts for Philus\_66:

(Start: 18 @42101 has 1 MA's), (Start: 20 @42110 has 69 MA's), (25, 42149), (33, 42227), (59, 42440),

Gene: Pollywog\_64 Start: 41787, Stop: 42128, Start Num: 20

Candidate Starts for Pollywog\_64:

(Start: 18 @41778 has 1 MA's), (Start: 20 @41787 has 69 MA's), (25, 41826), (33, 41904), (59, 42117),

Gene: Polo2Bam\_69 Start: 40804, Stop: 41145, Start Num: 20

Candidate Starts for Polo2Bam\_69:

(Start: 18 @40795 has 1 MA's), (Start: 20 @40804 has 69 MA's), (23, 40825), (27, 40840), (30, 40891), (43, 41029), (59, 41134),

Gene: QuickMath\_67 Start: 43563, Stop: 43904, Start Num: 20

Candidate Starts for QuickMath\_67:

(Start: 20 @43563 has 69 MA's), (25, 43602), (33, 43656), (50, 43818), (51, 43824), (56, 43851), (57, 43854),

Gene: Rebel\_53 Start: 34876, Stop: 35211, Start Num: 20

Candidate Starts for Rebel\_53:

(13, 34819), (Start: 20 @34876 has 69 MA's), (28, 34924), (31, 34957), (33, 34975), (55, 35143), (59, 35191),

Gene: RedBird\_61 Start: 40229, Stop: 40564, Start Num: 20

Candidate Starts for RedBird\_61:

(Start: 18 @40220 has 1 MA's), (Start: 20 @40229 has 69 MA's), (25, 40268), (33, 40340), (59, 40553),

Gene: Renaud18\_73 Start: 42883, Stop: 43242, Start Num: 20

Candidate Starts for Renaud18\_73:

(10, 42793), (Start: 20 @42883 has 69 MA's), (25, 42922), (33, 42994), (50, 43156), (51, 43162), (56, 43189), (57, 43192), (59, 43231),

Gene: Royals2015\_66 Start: 41205, Stop: 41546, Start Num: 20

Candidate Starts for Royals2015\_66:

(Start: 18 @41196 has 1 MA's), (Start: 20 @41205 has 69 MA's), (25, 41244), (33, 41322), (59, 41535),

Gene: Saal\_65 Start: 42221, Stop: 42562, Start Num: 20

Candidate Starts for Saal\_65:

(Start: 18 @42212 has 1 MA's), (Start: 20 @42221 has 69 MA's), (25, 42260), (33, 42338), (59, 42551),

Gene: Sarma624\_61 Start: 37375, Stop: 37716, Start Num: 20

Candidate Starts for Sarma624\_61:

(Start: 18 @37366 has 1 MA's), (Start: 20 @37375 has 69 MA's), (25, 37414), (33, 37492), (59, 37705),

Gene: Sassafras\_61 Start: 40547, Stop: 40882, Start Num: 20

Candidate Starts for Sassafras\_61:

(Start: 18 @40538 has 1 MA's), (Start: 20 @40547 has 69 MA's), (25, 40586), (33, 40658), (59, 40871),

Gene: SeaLumen\_68 Start: 40804, Stop: 41145, Start Num: 20

Candidate Starts for SeaLumen\_68:

(Start: 18 @40795 has 1 MA's), (Start: 20 @40804 has 69 MA's), (23, 40825), (27, 40840), (30, 40891), (43, 41029), (59, 41134),

Gene: SimranZ1\_64 Start: 41403, Stop: 41735, Start Num: 17

Candidate Starts for SimranZ1\_64:

(Start: 17 @41403 has 2 MA's), (24, 41433), (25, 41442), (33, 41520), (35, 41544), (37, 41562), (43, 41616), (48, 41643), (54, 41673), (59, 41724),

Gene: Soul22\_69 Start: 42555, Stop: 42905, Start Num: 20

Candidate Starts for Soul22\_69:

(Start: 18 @42546 has 1 MA's), (Start: 20 @42555 has 69 MA's), (25, 42594), (33, 42672), (43, 42786), (46, 42801), (48, 42813),

Gene: Tchotchke\_62 Start: 40712, Stop: 41053, Start Num: 20

Candidate Starts for Tchotchke\_62:

(Start: 18 @40703 has 1 MA's), (Start: 20 @40712 has 69 MA's), (25, 40751), (33, 40829), (59, 41042),

Gene: ThetaBob\_70 Start: 42862, Stop: 43218, Start Num: 20

Candidate Starts for ThetaBob\_70:

(9, 42760), (Start: 20 @42862 has 69 MA's), (25, 42901), (38, 43018), (50, 43132), (51, 43138), (59, 43207),

Gene: Thibault\_75 Start: 51674, Stop: 52018, Start Num: 20

Candidate Starts for Thibault\_75:

(11, 51590), (Start: 20 @51674 has 69 MA's), (25, 51713), (33, 51785), (44, 51902), (52, 51944), (59, 52007),

Gene: Topiatin\_70 Start: 43622, Stop: 43981, Start Num: 20

Candidate Starts for Topiatin\_70:

(Start: 18 @43613 has 1 MA's), (Start: 20 @43622 has 69 MA's), (25, 43661), (33, 43733), (50, 43895), (51, 43901), (56, 43928),

Gene: Velveteen\_58 Start: 37375, Stop: 37716, Start Num: 20

Candidate Starts for Velveteen\_58:

(Start: 18 @37366 has 1 MA's), (Start: 20 @37375 has 69 MA's), (25, 37414), (33, 37492), (59, 37705),

Gene: Wanda\_95 Start: 56202, Stop: 56543, Start Num: 20

Candidate Starts for Wanda\_95:

(7, 56070), (12, 56130), (14, 56151), (15, 56157), (Start: 20 @56202 has 69 MA's), (25, 56241), (33, 56295), (50, 56457), (51, 56463), (56, 56490), (57, 56493), (59, 56532),

Gene: Xiaokay\_80 Start: 52922, Stop: 53263, Start Num: 20

Candidate Starts for Xiaokay\_80:

(7, 52790), (12, 52850), (14, 52871), (15, 52877), (Start: 20 @52922 has 69 MA's), (25, 52961), (33, 53015), (50, 53177), (51, 53183), (56, 53210), (57, 53213), (59, 53252),

Gene: Yorick\_62 Start: 41335, Stop: 41676, Start Num: 20

Candidate Starts for Yorick\_62:

(Start: 18 @41326 has 1 MA's), (Start: 20 @41335 has 69 MA's), (25, 41374), (33, 41452), (59, 41665),

Gene: Yoshi\_78 Start: 43126, Stop: 43482, Start Num: 20

Candidate Starts for Yoshi\_78:

(9, 43024), (Start: 20 @43126 has 69 MA's), (25, 43165), (38, 43282), (50, 43396), (51, 43402), (59, 43471),

Gene: Zelink\_88 Start: 57397, Stop: 57738, Start Num: 20

Candidate Starts for Zelink\_88:

(7, 57265), (12, 57325), (14, 57346), (15, 57352), (Start: 20 @57397 has 69 MA's), (25, 57436), (33, 57490), (50, 57652), (51, 57658), (56, 57685), (57, 57688), (59, 57727),