



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 311602 Report

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

Pham number 311602 has 63 members, 3 are drafts.

Phages represented in each track:

- Track 1 : Doomslug\_53
- Track 2 : Hlubikazi\_43, Strokeseat\_44, Mandlovu\_43, DaWorst\_47
- Track 3 : Sarma624\_41, Coco12\_42, Brookers\_41, Cerasum\_40, Velveteen\_39, Kingsley\_40, BigPhil\_40
- Track 4 : BlueCrab\_43, Poenanya\_45, RedBird\_42
- Track 5 : Fancypants\_45, MilleniumForce\_44, Whatsapiecost\_43, Kimberlium\_46, Bubbles123\_42, Wachhund\_47, QuickMath\_45, Soul22\_49
- Track 6 : Polo2Bam\_52, Mutaforma13\_47, NewHope4\_47, MulchExplorer\_46
- Track 7 : ChickenDinner\_43, Piper2020\_44
- Track 8 : Che8\_48, Juniper1\_42
- Track 9 : MisterCuddles\_45, Sassafras\_45, Girr\_46, Daenerys\_42
- Track 10 : Cornucopia\_49
- Track 11 : Hegedechwinu\_44, AlpineSix\_47, Pollywog\_44, Madiba\_41, Ochi17\_45, Jinglebell\_47, UncleRicky\_45, Beanstalk\_47, Whouxphf\_44, Kersh\_46
- Track 12 : DocMcStuffins\_43
- Track 13 : Misha28\_42, Awesomesauce\_44, Aoberi\_44, TootsiePop\_42
- Track 14 : Maravista\_45
- Track 15 : Juice456\_47
- Track 16 : Minnie\_48
- Track 17 : Empress\_46
- Track 18 : Byougenkin\_42
- Track 19 : Sabbb\_50
- Track 20 : Doug\_45
- Track 21 : Rialto\_49
- Track 22 : Bobi\_48
- Track 23 : Renaud18\_48
- Track 24 : Cornie\_37, Mahavrat\_42

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

The start number called the most often in the published annotations is 19, it was called in 24 of the 60 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- AlpineSix\_47, Beanstalk\_47, BlueCrab\_43, Bobi\_48, DaWorst\_47, Daenerys\_42, Empress\_46, Girr\_46, Hegedechwinu\_44, Hlubikazi\_43, Jinglebell\_47, Kersh\_46, Madiba\_41, Mandlovu\_43, MisterCuddles\_45, Ochi17\_45, Poenanya\_45, Pollywog\_44, RedBird\_42, Renaud18\_48, Rialto\_49, Sassafras\_45, Strokeseat\_44, UncleRicky\_45, Whouxphf\_44,

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

- BigPhil\_40, Brookers\_41, Cerasum\_40, Coco12\_42, Cornucopia\_49, Doomslug\_53, Juice456\_47, Kingsley\_40, Minnie\_48, Sarma624\_41, Velveteen\_39,

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

- Aloeri\_44, Awesomesauce\_44, Bubbles123\_42, Byougenkin\_42, Che8\_48, ChickenDinner\_43, Cornie\_37, DocMcStuffins\_43, Doug\_45, Fancypants\_45, Juniper1\_42, Kimberlium\_46, Mahavrat\_42, Maravista\_45, MilleniumForce\_44, Misha28\_42, MulchExplorer\_46, Mutaforma13\_47, NewHope4\_47, Piper2020\_44, Polo2Bam\_52, QuickMath\_45, Sabbb\_50, Soul22\_49, TootsiePop\_42, Wachhund\_47, Whatsapiecost\_43,

### Summary by start number:

Start 1:

- Found in 3 of 63 ( 4.8% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Sabbb\_50 (F1),

Start 10:

- Found in 27 of 63 ( 42.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 7.4% of time when present
- Phage (with cluster) where this start called: Cornucopia\_49 (F1), Doomslug\_53 (F),

Start 11:

- Found in 5 of 63 ( 7.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Minnie\_48 (F1),

Start 13:

- Found in 20 of 63 ( 31.7% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 5.0% of time when present
- Phage (with cluster) where this start called: Juice456\_47 (F1),

Start 14:

- Found in 22 of 63 ( 34.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 4.5% of time when present
- Phage (with cluster) where this start called: Byougenkin\_42 (F1),

Start 15:

- Found in 14 of 63 ( 22.2% ) of genes in pham
- Manual Annotations of this start: 8 of 60

- Called 57.1% of time when present
- Phage (with cluster) where this start called: Bubbles123\_42 (F1), Fancypants\_45 (F1), Kimberlium\_46 (F1), MilleniumForce\_44 (F1), QuickMath\_45 (F1), Soul22\_49 (F2), Wachhund\_47 (F1), Whatsapiecost\_43 (F1),

#### Start 17:

- Found in 7 of 63 ( 11.1% ) of genes in pham
- Manual Annotations of this start: 4 of 60
- Called 57.1% of time when present
- Phage (with cluster) where this start called: Aloeri\_44 (F1), Awesomesauce\_44 (F1), Misha28\_42 (F1), TootsiePop\_42 (F1),

#### Start 18:

- Found in 27 of 63 ( 42.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 3.7% of time when present
- Phage (with cluster) where this start called: Maravista\_45 (F1),

#### Start 19:

- Found in 36 of 63 ( 57.1% ) of genes in pham
- Manual Annotations of this start: 24 of 60
- Called 69.4% of time when present
- Phage (with cluster) where this start called: AlpineSix\_47 (F1), Beanstalk\_47 (F1), BlueCrab\_43 (F1), Bobi\_48 (F1), DaWorst\_47 (F1), Daenerys\_42 (F1), Empress\_46 (F1), Girr\_46 (F1), Hegedechwinu\_44 (F1), Hlubikazi\_43 (F1), Jinglebell\_47 (F1), Kersh\_46 (F1), Madiba\_41 (F1), Mandlovu\_43 (F1), MisterCuddles\_45 (F1), Ochi17\_45 (F1), Poenanya\_45 (F1), Pollywog\_44 (F1), RedBird\_42 (F1), Renaud18\_48 (F4), Rialto\_49 (F1), Sassafras\_45 (F1), Strokeseat\_44 (F1), UncleRicky\_45 (F1), Whouxphf\_44 (F1),

#### Start 20:

- Found in 27 of 63 ( 42.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 3.7% of time when present
- Phage (with cluster) where this start called: Doug\_45 (F1),

#### Start 21:

- Found in 27 of 63 ( 42.9% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 3.7% of time when present
- Phage (with cluster) where this start called: DocMcStuffins\_43 (F1),

#### Start 22:

- Found in 35 of 63 ( 55.6% ) of genes in pham
- Manual Annotations of this start: 16 of 60
- Called 48.6% of time when present
- Phage (with cluster) where this start called: BigPhil\_40 (F1), Brookers\_41 (F1), Cerasum\_40 (F1), Che8\_48 (F1), ChickenDinner\_43 (F1), Coco12\_42 (F1), Cornie\_37 (F5), Juniper1\_42 (F1), Kingsley\_40 (F1), Mahavrat\_42 (F1), MulchExplorer\_46 (F1), Mutaforma13\_47 (F1), NewHope4\_47 (F1), Piper2020\_44 (F1), Polo2Bam\_52 (F1), Sarma624\_41 (F1), Velveteen\_39 (F1),

### Summary by clusters:

There are 5 clusters represented in this pham: F1, F2, F4, F5, F,

Info for manual annotations of cluster F1:

- Start number 1 was manually annotated 1 time for cluster F1.
- Start number 10 was manually annotated 1 time for cluster F1.
- Start number 11 was manually annotated 1 time for cluster F1.
- Start number 13 was manually annotated 1 time for cluster F1.
- Start number 14 was manually annotated 1 time for cluster F1.
- Start number 15 was manually annotated 7 times for cluster F1.
- Start number 17 was manually annotated 4 times for cluster F1.
- Start number 18 was manually annotated 1 time for cluster F1.
- Start number 19 was manually annotated 23 times for cluster F1.
- Start number 20 was manually annotated 1 time for cluster F1.
- Start number 21 was manually annotated 1 time for cluster F1.
- Start number 22 was manually annotated 15 times for cluster F1.

Info for manual annotations of cluster F2:

- Start number 15 was manually annotated 1 time for cluster F2.

Info for manual annotations of cluster F4:

- Start number 19 was manually annotated 1 time for cluster F4.

Info for manual annotations of cluster F5:

- Start number 22 was manually annotated 1 time for cluster F5.

**Gene Information:**

Gene: Aloeri\_44 Start: 34127, Stop: 33540, Start Num: 17

Candidate Starts for Aloeri\_44:

(9, 34211), (Start: 14 @34151 has 1 MA's), (Start: 17 @34127 has 4 MA's), (Start: 18 @34109 has 1 MA's), (Start: 20 @34103 has 1 MA's), (Start: 21 @34085 has 1 MA's), (Start: 22 @34073 has 16 MA's), (23, 34064), (24, 33995), (27, 33944), (29, 33881), (33, 33797), (34, 33791), (35, 33743), (36, 33722),

Gene: AlpineSix\_47 Start: 35804, Stop: 35232, Start Num: 19

Candidate Starts for AlpineSix\_47:

(2, 35978), (3, 35972), (Start: 10 @35903 has 1 MA's), (Start: 13 @35852 has 1 MA's), (16, 35834), (Start: 19 @35804 has 24 MA's), (28, 35585), (36, 35414),

Gene: Awesomesauce\_44 Start: 33389, Stop: 32802, Start Num: 17

Candidate Starts for Awesomesauce\_44:

(9, 33473), (Start: 14 @33413 has 1 MA's), (Start: 17 @33389 has 4 MA's), (Start: 18 @33371 has 1 MA's), (Start: 20 @33365 has 1 MA's), (Start: 21 @33347 has 1 MA's), (Start: 22 @33335 has 16 MA's), (23, 33326), (24, 33257), (27, 33206), (29, 33143), (33, 33059), (34, 33053), (35, 33005), (36, 32984),

Gene: Beanstalk\_47 Start: 34304, Stop: 33732, Start Num: 19

Candidate Starts for Beanstalk\_47:

(2, 34478), (3, 34472), (Start: 10 @34403 has 1 MA's), (Start: 13 @34352 has 1 MA's), (16, 34334), (Start: 19 @34304 has 24 MA's), (28, 34085), (36, 33914),

Gene: BigPhil\_40 Start: 30335, Stop: 29802, Start Num: 22

Candidate Starts for BigPhil\_40:

(Start: 19 @30368 has 24 MA's), (Start: 22 @30335 has 16 MA's), (26, 30206), (27, 30203), (29, 30140), (32, 30074), (34, 30050), (36, 29981),

Gene: BlueCrab\_43 Start: 34399, Stop: 33827, Start Num: 19

Candidate Starts for BlueCrab\_43:

(2, 34573), (3, 34567), (5, 34552), (Start: 10 @34498 has 1 MA's), (Start: 13 @34447 has 1 MA's), (16, 34429), (Start: 19 @34399 has 24 MA's), (28, 34180), (36, 34009),

Gene: Bobi\_48 Start: 36367, Stop: 35798, Start Num: 19

Candidate Starts for Bobi\_48:

(Start: 10 @36466 has 1 MA's), (16, 36397), (Start: 19 @36367 has 24 MA's), (25, 36211), (28, 36148), (30, 36115), (36, 35977),

Gene: Brookers\_41 Start: 33286, Stop: 32753, Start Num: 22

Candidate Starts for Brookers\_41:

(Start: 19 @33319 has 24 MA's), (Start: 22 @33286 has 16 MA's), (26, 33157), (27, 33154), (29, 33091), (32, 33025), (34, 33001), (36, 32932),

Gene: Bubbles123\_42 Start: 35115, Stop: 34513, Start Num: 15

Candidate Starts for Bubbles123\_42:

(Start: 14 @35121 has 1 MA's), (Start: 15 @35115 has 8 MA's), (Start: 18 @35079 has 1 MA's), (Start: 20 @35073 has 1 MA's), (Start: 21 @35055 has 1 MA's), (Start: 22 @35043 has 16 MA's), (26, 34917), (27, 34914), (29, 34851), (31, 34803), (34, 34761), (36, 34692),

Gene: Byougenkin\_42 Start: 34510, Stop: 33902, Start Num: 14

Candidate Starts for Byougenkin\_42:

(Start: 14 @34510 has 1 MA's), (Start: 18 @34468 has 1 MA's), (Start: 20 @34462 has 1 MA's), (Start: 21 @34444 has 1 MA's), (Start: 22 @34432 has 16 MA's), (26, 34306), (27, 34303), (29, 34240), (31, 34192), (34, 34150), (36, 34081),

Gene: Cerasum\_40 Start: 30353, Stop: 29820, Start Num: 22

Candidate Starts for Cerasum\_40:

(Start: 19 @30386 has 24 MA's), (Start: 22 @30353 has 16 MA's), (26, 30224), (27, 30221), (29, 30158), (32, 30092), (34, 30068), (36, 29999),

Gene: Che8\_48 Start: 35596, Stop: 35063, Start Num: 22

Candidate Starts for Che8\_48:

(4, 35779), (6, 35770), (7, 35755), (8, 35740), (Start: 18 @35632 has 1 MA's), (Start: 20 @35626 has 1 MA's), (Start: 21 @35608 has 1 MA's), (Start: 22 @35596 has 16 MA's), (26, 35470), (27, 35467), (29, 35404), (31, 35356), (34, 35314), (36, 35245),

Gene: ChickenDinner\_43 Start: 34073, Stop: 33540, Start Num: 22

Candidate Starts for ChickenDinner\_43:

(9, 34211), (Start: 14 @34151 has 1 MA's), (Start: 17 @34127 has 4 MA's), (Start: 18 @34109 has 1 MA's), (Start: 20 @34103 has 1 MA's), (Start: 21 @34085 has 1 MA's), (Start: 22 @34073 has 16 MA's), (23, 34064), (24, 33995), (27, 33944), (29, 33881), (33, 33797), (34, 33791), (35, 33743), (36, 33722),

Gene: Coco12\_42 Start: 34410, Stop: 33877, Start Num: 22

Candidate Starts for Coco12\_42:

(Start: 19 @34443 has 24 MA's), (Start: 22 @34410 has 16 MA's), (26, 34281), (27, 34278), (29, 34215), (32, 34149), (34, 34125), (36, 34056),

Gene: Cornie\_37 Start: 32469, Stop: 31936, Start Num: 22

Candidate Starts for Cornie\_37:

(Start: 1 @32688 has 1 MA's), (4, 32652), (6, 32643), (7, 32628), (Start: 18 @32505 has 1 MA's), (Start: 20 @32499 has 1 MA's), (Start: 21 @32481 has 1 MA's), (Start: 22 @32469 has 16 MA's), (26, 32343), (27, 32340), (29, 32277), (31, 32229), (34, 32187), (35, 32139), (36, 32118),

Gene: Cornucopia\_49 Start: 36045, Stop: 35377, Start Num: 10

Candidate Starts for Cornucopia\_49:

(Start: 10 @36045 has 1 MA's), (16, 35976), (Start: 19 @35946 has 24 MA's), (25, 35790), (28, 35727), (30, 35694), (36, 35556),

Gene: DaWorst\_47 Start: 35474, Stop: 34905, Start Num: 19

Candidate Starts for DaWorst\_47:

(Start: 10 @35573 has 1 MA's), (12, 35525), (16, 35504), (Start: 19 @35474 has 24 MA's), (25, 35318), (28, 35255), (30, 35222), (36, 35084),

Gene: Daenerys\_42 Start: 34265, Stop: 33693, Start Num: 19

Candidate Starts for Daenerys\_42:

(2, 34439), (3, 34433), (Start: 10 @34364 has 1 MA's), (Start: 11 @34319 has 1 MA's), (Start: 13 @34313 has 1 MA's), (16, 34295), (Start: 19 @34265 has 24 MA's), (28, 34046), (36, 33875),

Gene: DocMcStuffins\_43 Start: 34085, Stop: 33540, Start Num: 21

Candidate Starts for DocMcStuffins\_43:

(9, 34211), (Start: 14 @34151 has 1 MA's), (Start: 17 @34127 has 4 MA's), (Start: 18 @34109 has 1 MA's), (Start: 20 @34103 has 1 MA's), (Start: 21 @34085 has 1 MA's), (Start: 22 @34073 has 16 MA's), (23, 34064), (24, 33995), (27, 33944), (29, 33881), (33, 33797), (34, 33791), (35, 33743), (36, 33722),

Gene: Doomslug\_53 Start: 34691, Stop: 34023, Start Num: 10

Candidate Starts for Doomslug\_53:

(Start: 10 @34691 has 1 MA's), (12, 34643), (16, 34622), (Start: 19 @34592 has 24 MA's), (25, 34436), (28, 34373), (30, 34340), (36, 34202),

Gene: Doug\_45 Start: 34931, Stop: 34371, Start Num: 20

Candidate Starts for Doug\_45:

(Start: 14 @34979 has 1 MA's), (Start: 15 @34973 has 8 MA's), (Start: 18 @34937 has 1 MA's), (Start: 20 @34931 has 1 MA's), (Start: 21 @34913 has 1 MA's), (Start: 22 @34901 has 16 MA's), (26, 34775), (27, 34772), (29, 34709), (31, 34661), (34, 34619), (36, 34550),

Gene: Empress\_46 Start: 35678, Stop: 35106, Start Num: 19

Candidate Starts for Empress\_46:

(Start: 19 @35678 has 24 MA's), (28, 35459), (36, 35288),

Gene: Fancypants\_45 Start: 35388, Stop: 34783, Start Num: 15

Candidate Starts for Fancypants\_45:

(Start: 14 @35394 has 1 MA's), (Start: 15 @35388 has 8 MA's), (Start: 18 @35352 has 1 MA's), (Start: 20 @35346 has 1 MA's), (Start: 21 @35328 has 1 MA's), (Start: 22 @35316 has 16 MA's), (26, 35190), (27, 35187), (29, 35124), (31, 35076), (34, 35034), (36, 34965),

Gene: Girr\_46 Start: 35274, Stop: 34702, Start Num: 19

Candidate Starts for Girr\_46:

(2, 35448), (3, 35442), (Start: 10 @35373 has 1 MA's), (Start: 11 @35328 has 1 MA's), (Start: 13 @35322 has 1 MA's), (16, 35304), (Start: 19 @35274 has 24 MA's), (28, 35055), (36, 34884),

Gene: Hegedechwinu\_44 Start: 33406, Stop: 32837, Start Num: 19

Candidate Starts for Hegedechwinu\_44:

(2, 33580), (3, 33574), (Start: 10 @33505 has 1 MA's), (Start: 13 @33454 has 1 MA's), (16, 33436), (Start: 19 @33406 has 24 MA's), (28, 33187), (36, 33016),

Gene: Hlubikazi\_43 Start: 34252, Stop: 33683, Start Num: 19

Candidate Starts for Hlubikazi\_43:

(Start: 10 @34351 has 1 MA's), (12, 34303), (16, 34282), (Start: 19 @34252 has 24 MA's), (25, 34096), (28, 34033), (30, 34000), (36, 33862),

Gene: Jinglebell\_47 Start: 35803, Stop: 35231, Start Num: 19

Candidate Starts for Jinglebell\_47:

(2, 35977), (3, 35971), (Start: 10 @35902 has 1 MA's), (Start: 13 @35851 has 1 MA's), (16, 35833), (Start: 19 @35803 has 24 MA's), (28, 35584), (36, 35413),

Gene: Juice456\_47 Start: 36056, Stop: 35439, Start Num: 13

Candidate Starts for Juice456\_47:

(2, 36182), (3, 36176), (Start: 10 @36107 has 1 MA's), (Start: 13 @36056 has 1 MA's), (16, 36038), (Start: 19 @36008 has 24 MA's), (28, 35789), (36, 35618),

Gene: Juniper1\_42 Start: 34132, Stop: 33599, Start Num: 22

Candidate Starts for Juniper1\_42:

(4, 34315), (6, 34306), (7, 34291), (8, 34276), (Start: 18 @34168 has 1 MA's), (Start: 20 @34162 has 1 MA's), (Start: 21 @34144 has 1 MA's), (Start: 22 @34132 has 16 MA's), (26, 34006), (27, 34003), (29, 33940), (31, 33892), (34, 33850), (36, 33781),

Gene: Kersh\_46 Start: 36309, Stop: 35737, Start Num: 19

Candidate Starts for Kersh\_46:

(2, 36483), (3, 36477), (Start: 10 @36408 has 1 MA's), (Start: 13 @36357 has 1 MA's), (16, 36339), (Start: 19 @36309 has 24 MA's), (28, 36090), (36, 35919),

Gene: Kimberlium\_46 Start: 35638, Stop: 35036, Start Num: 15

Candidate Starts for Kimberlium\_46:

(Start: 14 @35644 has 1 MA's), (Start: 15 @35638 has 8 MA's), (Start: 18 @35602 has 1 MA's), (Start: 20 @35596 has 1 MA's), (Start: 21 @35578 has 1 MA's), (Start: 22 @35566 has 16 MA's), (26, 35440), (27, 35437), (29, 35374), (31, 35326), (34, 35284), (36, 35215),

Gene: Kingsley\_40 Start: 33143, Stop: 32610, Start Num: 22

Candidate Starts for Kingsley\_40:

(Start: 19 @33176 has 24 MA's), (Start: 22 @33143 has 16 MA's), (26, 33014), (27, 33011), (29, 32948), (32, 32882), (34, 32858), (36, 32789),

Gene: Madiba\_41 Start: 33006, Stop: 32434, Start Num: 19

Candidate Starts for Madiba\_41:

(2, 33180), (3, 33174), (Start: 10 @33105 has 1 MA's), (Start: 13 @33054 has 1 MA's), (16, 33036), (Start: 19 @33006 has 24 MA's), (28, 32787), (36, 32616),

Gene: Mahavrat\_42 Start: 33928, Stop: 33395, Start Num: 22

Candidate Starts for Mahavrat\_42:

(Start: 1 @34147 has 1 MA's), (4, 34111), (6, 34102), (7, 34087), (Start: 18 @33964 has 1 MA's), (Start: 20 @33958 has 1 MA's), (Start: 21 @33940 has 1 MA's), (Start: 22 @33928 has 16 MA's), (26, 33802), (27, 33799), (29, 33736), (31, 33688), (34, 33646), (35, 33598), (36, 33577),

Gene: Mandlovu\_43 Start: 34194, Stop: 33625, Start Num: 19

Candidate Starts for Mandlovu\_43:

(Start: 10 @34293 has 1 MA's), (12, 34245), (16, 34224), (Start: 19 @34194 has 24 MA's), (25, 34038), (28, 33975), (30, 33942), (36, 33804),

Gene: Maravista\_45 Start: 35361, Stop: 34792, Start Num: 18

Candidate Starts for Maravista\_45:

(Start: 14 @35403 has 1 MA's), (Start: 15 @35397 has 8 MA's), (Start: 18 @35361 has 1 MA's), (Start: 20 @35355 has 1 MA's), (Start: 21 @35337 has 1 MA's), (Start: 22 @35325 has 16 MA's), (26, 35199), (27, 35196), (29, 35133), (31, 35085), (34, 35043), (36, 34974),

Gene: MilleniumForce\_44 Start: 35371, Stop: 34769, Start Num: 15

Candidate Starts for MilleniumForce\_44:

(Start: 14 @35377 has 1 MA's), (Start: 15 @35371 has 8 MA's), (Start: 18 @35335 has 1 MA's), (Start: 20 @35329 has 1 MA's), (Start: 21 @35311 has 1 MA's), (Start: 22 @35299 has 16 MA's), (26, 35173), (27, 35170), (29, 35107), (31, 35059), (34, 35017), (36, 34948),

Gene: Minnie\_48 Start: 35798, Stop: 35175, Start Num: 11

Candidate Starts for Minnie\_48:

(2, 35918), (3, 35912), (Start: 10 @35843 has 1 MA's), (Start: 11 @35798 has 1 MA's), (Start: 13 @35792 has 1 MA's), (16, 35774), (Start: 19 @35744 has 24 MA's), (28, 35525), (36, 35354),

Gene: Misha28\_42 Start: 33394, Stop: 32807, Start Num: 17

Candidate Starts for Misha28\_42:

(9, 33478), (Start: 14 @33418 has 1 MA's), (Start: 17 @33394 has 4 MA's), (Start: 18 @33376 has 1 MA's), (Start: 20 @33370 has 1 MA's), (Start: 21 @33352 has 1 MA's), (Start: 22 @33340 has 16 MA's), (23, 33331), (24, 33262), (27, 33211), (29, 33148), (33, 33064), (34, 33058), (35, 33010), (36, 32989),

Gene: MisterCuddles\_45 Start: 35274, Stop: 34702, Start Num: 19

Candidate Starts for MisterCuddles\_45:

(2, 35448), (3, 35442), (Start: 10 @35373 has 1 MA's), (Start: 11 @35328 has 1 MA's), (Start: 13 @35322 has 1 MA's), (16, 35304), (Start: 19 @35274 has 24 MA's), (28, 35055), (36, 34884),

Gene: MulchExplorer\_46 Start: 35565, Stop: 35035, Start Num: 22

Candidate Starts for MulchExplorer\_46:

(Start: 14 @35643 has 1 MA's), (Start: 15 @35637 has 8 MA's), (Start: 18 @35601 has 1 MA's), (Start: 20 @35595 has 1 MA's), (Start: 21 @35577 has 1 MA's), (Start: 22 @35565 has 16 MA's), (26, 35439), (27, 35436), (29, 35373), (31, 35325), (34, 35283), (36, 35214),

Gene: Mutaforma13\_47 Start: 35601, Stop: 35071, Start Num: 22

Candidate Starts for Mutaforma13\_47:

(Start: 14 @35679 has 1 MA's), (Start: 15 @35673 has 8 MA's), (Start: 18 @35637 has 1 MA's), (Start: 20 @35631 has 1 MA's), (Start: 21 @35613 has 1 MA's), (Start: 22 @35601 has 16 MA's), (26, 35475), (27, 35472), (29, 35409), (31, 35361), (34, 35319), (36, 35250),

Gene: NewHope4\_47 Start: 35189, Stop: 34659, Start Num: 22

Candidate Starts for NewHope4\_47:

(Start: 14 @35267 has 1 MA's), (Start: 15 @35261 has 8 MA's), (Start: 18 @35225 has 1 MA's), (Start: 20 @35219 has 1 MA's), (Start: 21 @35201 has 1 MA's), (Start: 22 @35189 has 16 MA's), (26, 35063), (27, 35060), (29, 34997), (31, 34949), (34, 34907), (36, 34838),

Gene: Ochi17\_45 Start: 35254, Stop: 34682, Start Num: 19

Candidate Starts for Ochi17\_45:

(2, 35428), (3, 35422), (Start: 10 @35353 has 1 MA's), (Start: 13 @35302 has 1 MA's), (16, 35284), (Start: 19 @35254 has 24 MA's), (28, 35035), (36, 34864),

Gene: Piper2020\_44 Start: 34056, Stop: 33523, Start Num: 22

Candidate Starts for Piper2020\_44:

(9, 34194), (Start: 14 @34134 has 1 MA's), (Start: 17 @34110 has 4 MA's), (Start: 18 @34092 has 1 MA's), (Start: 20 @34086 has 1 MA's), (Start: 21 @34068 has 1 MA's), (Start: 22 @34056 has 16 MA's), (23, 34047), (24, 33978), (27, 33927), (29, 33864), (33, 33780), (34, 33774), (35, 33726), (36, 33705),

Gene: Poenanya\_45 Start: 35613, Stop: 35041, Start Num: 19

Candidate Starts for Poenanya\_45:

(2, 35787), (3, 35781), (5, 35766), (Start: 10 @35712 has 1 MA's), (Start: 13 @35661 has 1 MA's), (16, 35643), (Start: 19 @35613 has 24 MA's), (28, 35394), (36, 35223),

Gene: Pollywog\_44 Start: 34791, Stop: 34219, Start Num: 19

Candidate Starts for Pollywog\_44:

(2, 34965), (3, 34959), (Start: 10 @34890 has 1 MA's), (Start: 13 @34839 has 1 MA's), (16, 34821), (Start: 19 @34791 has 24 MA's), (28, 34572), (36, 34401),

Gene: Polo2Bam\_52 Start: 35043, Stop: 34513, Start Num: 22

Candidate Starts for Polo2Bam\_52:

(Start: 14 @35121 has 1 MA's), (Start: 15 @35115 has 8 MA's), (Start: 18 @35079 has 1 MA's), (Start: 20 @35073 has 1 MA's), (Start: 21 @35055 has 1 MA's), (Start: 22 @35043 has 16 MA's), (26, 34917), (27, 34914), (29, 34851), (31, 34803), (34, 34761), (36, 34692),

Gene: QuickMath\_45 Start: 35861, Stop: 35259, Start Num: 15

Candidate Starts for QuickMath\_45:

(Start: 14 @35867 has 1 MA's), (Start: 15 @35861 has 8 MA's), (Start: 18 @35825 has 1 MA's), (Start: 20 @35819 has 1 MA's), (Start: 21 @35801 has 1 MA's), (Start: 22 @35789 has 16 MA's), (26, 35663), (27, 35660), (29, 35597), (31, 35549), (34, 35507), (36, 35438),

Gene: RedBird\_42 Start: 34424, Stop: 33852, Start Num: 19

Candidate Starts for RedBird\_42:

(2, 34598), (3, 34592), (5, 34577), (Start: 10 @34523 has 1 MA's), (Start: 13 @34472 has 1 MA's), (16, 34454), (Start: 19 @34424 has 24 MA's), (28, 34205), (36, 34034),

Gene: Renaud18\_48 Start: 35135, Stop: 34566, Start Num: 19

Candidate Starts for Renaud18\_48:

(2, 35309), (3, 35303), (Start: 10 @35234 has 1 MA's), (Start: 13 @35183 has 1 MA's), (16, 35165), (Start: 19 @35135 has 24 MA's), (28, 34916), (30, 34883), (36, 34745),

Gene: Rialto\_49 Start: 36855, Stop: 36289, Start Num: 19

Candidate Starts for Rialto\_49:

(Start: 19 @36855 has 24 MA's), (Start: 22 @36822 has 16 MA's), (26, 36693), (27, 36690), (29, 36627), (32, 36561), (34, 36537), (36, 36468),

Gene: Sabbb\_50 Start: 36282, Stop: 35530, Start Num: 1

Candidate Starts for Sabbb\_50:

(Start: 1 @36282 has 1 MA's), (4, 36246), (7, 36222), (8, 36207), (Start: 18 @36099 has 1 MA's), (Start: 20 @36093 has 1 MA's), (Start: 21 @36075 has 1 MA's), (Start: 22 @36063 has 16 MA's), (26, 35937), (27, 35934), (29, 35871), (31, 35823), (34, 35781), (36, 35712),

Gene: Sarma624\_41 Start: 30335, Stop: 29802, Start Num: 22

Candidate Starts for Sarma624\_41:

(Start: 19 @30368 has 24 MA's), (Start: 22 @30335 has 16 MA's), (26, 30206), (27, 30203), (29, 30140), (32, 30074), (34, 30050), (36, 29981),

Gene: Sassafras\_45 Start: 34945, Stop: 34373, Start Num: 19

Candidate Starts for Sassafras\_45:

(2, 35119), (3, 35113), (Start: 10 @35044 has 1 MA's), (Start: 11 @34999 has 1 MA's), (Start: 13 @34993 has 1 MA's), (16, 34975), (Start: 19 @34945 has 24 MA's), (28, 34726), (36, 34555),

Gene: Soul22\_49 Start: 34817, Stop: 34215, Start Num: 15

Candidate Starts for Soul22\_49:

(Start: 14 @34823 has 1 MA's), (Start: 15 @34817 has 8 MA's), (Start: 18 @34781 has 1 MA's), (Start: 20 @34775 has 1 MA's), (Start: 21 @34757 has 1 MA's), (Start: 22 @34745 has 16 MA's), (26, 34619), (27, 34616), (29, 34553), (31, 34505), (34, 34463), (36, 34394),

Gene: Strokeseat\_44 Start: 34251, Stop: 33682, Start Num: 19

Candidate Starts for Strokeseat\_44:

(Start: 10 @34350 has 1 MA's), (12, 34302), (16, 34281), (Start: 19 @34251 has 24 MA's), (25, 34095), (28, 34032), (30, 33999), (36, 33861),

Gene: TootsiePop\_42 Start: 33394, Stop: 32807, Start Num: 17

Candidate Starts for TootsiePop\_42:

(9, 33478), (Start: 14 @33418 has 1 MA's), (Start: 17 @33394 has 4 MA's), (Start: 18 @33376 has 1 MA's), (Start: 20 @33370 has 1 MA's), (Start: 21 @33352 has 1 MA's), (Start: 22 @33340 has 16 MA's), (23, 33331), (24, 33262), (27, 33211), (29, 33148), (33, 33064), (34, 33058), (35, 33010), (36, 32989),

Gene: UncleRicky\_45 Start: 35416, Stop: 34844, Start Num: 19

Candidate Starts for UncleRicky\_45:

(2, 35590), (3, 35584), (Start: 10 @35515 has 1 MA's), (Start: 13 @35464 has 1 MA's), (16, 35446), (Start: 19 @35416 has 24 MA's), (28, 35197), (36, 35026),

Gene: Velveteen\_39 Start: 30335, Stop: 29802, Start Num: 22

Candidate Starts for Velveteen\_39:

(Start: 19 @30368 has 24 MA's), (Start: 22 @30335 has 16 MA's), (26, 30206), (27, 30203), (29, 30140), (32, 30074), (34, 30050), (36, 29981),

Gene: Wachhund\_47 Start: 34586, Stop: 33981, Start Num: 15

Candidate Starts for Wachhund\_47:

(Start: 14 @34592 has 1 MA's), (Start: 15 @34586 has 8 MA's), (Start: 18 @34550 has 1 MA's), (Start: 20 @34544 has 1 MA's), (Start: 21 @34526 has 1 MA's), (Start: 22 @34514 has 16 MA's), (26, 34388), (27, 34385), (29, 34322), (31, 34274), (34, 34232), (36, 34163),

Gene: Whatsapiecost\_43 Start: 33848, Stop: 33246, Start Num: 15

Candidate Starts for Whatsapiecost\_43:

(Start: 14 @33854 has 1 MA's), (Start: 15 @33848 has 8 MA's), (Start: 18 @33812 has 1 MA's), (Start: 20 @33806 has 1 MA's), (Start: 21 @33788 has 1 MA's), (Start: 22 @33776 has 16 MA's), (26, 33650), (27, 33647), (29, 33584), (31, 33536), (34, 33494), (36, 33425),

Gene: Whouxphf\_44 Start: 34589, Stop: 34017, Start Num: 19

Candidate Starts for Whouxphf\_44:

(2, 34763), (3, 34757), (Start: 10 @34688 has 1 MA's), (Start: 13 @34637 has 1 MA's), (16, 34619), (Start: 19 @34589 has 24 MA's), (28, 34370), (36, 34199),