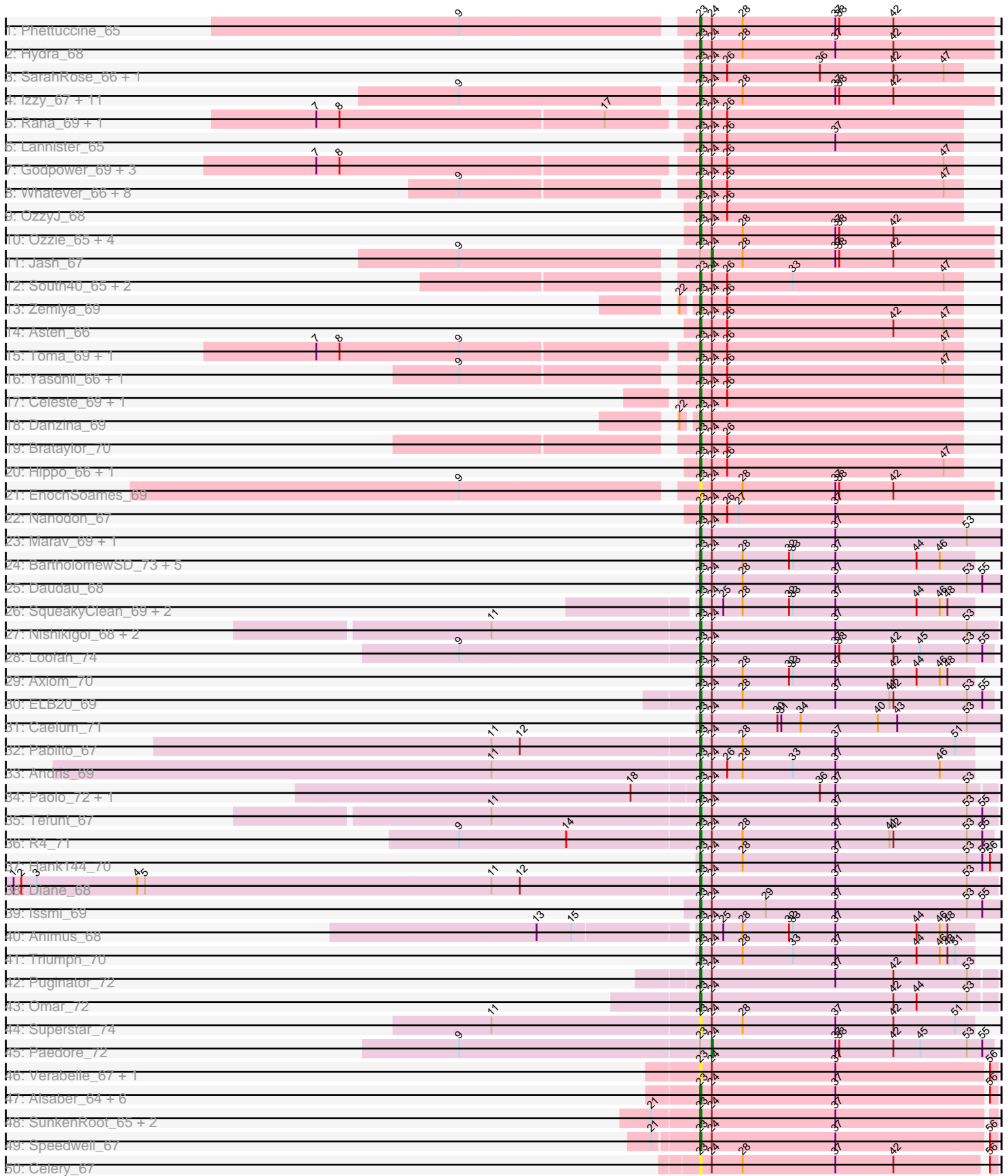
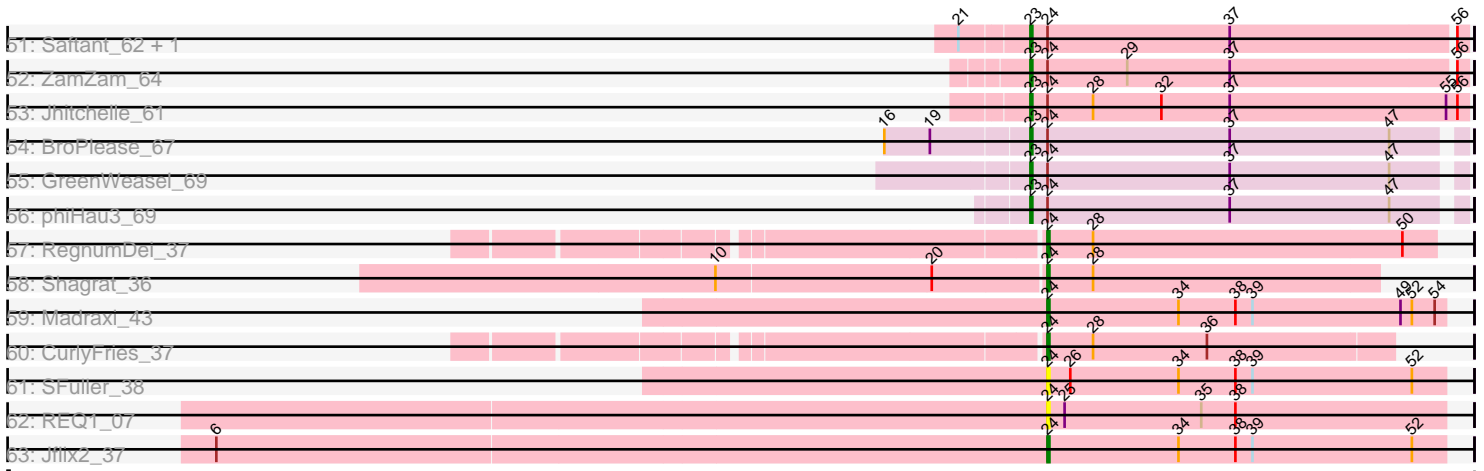


Pham 308300



Pham 308300



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 308300 Report

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

Pham number 308300 has 118 members, 8 are drafts.

Phages represented in each track:

- Track 1 : Phettuccine\_65
- Track 2 : Hydra\_68
- Track 3 : SarahRose\_66, Snorlax\_66
- Track 4 : Izzy\_67, Esperer\_66, BryanRecycles\_67, Eddasa\_68, Indigo\_64, Bovely\_65, Rusticus\_67, Aaronocolus\_65, Oliynyk\_67, Nerdos\_64, Leviticus\_66, Unstoppable\_65
- Track 5 : Rana\_69, Lorelei\_68
- Track 6 : Lannister\_65
- Track 7 : Godpower\_69, Lika\_68, Sujidade\_69, Nabi\_69
- Track 8 : Whatever\_66, Emaanora\_69, Triste\_67, Dwayne\_66, TuanPN\_64, TagePghter\_68, Werner\_66, Ejemplo\_64, Chucky\_66
- Track 9 : OzzyJ\_68
- Track 10 : Ozzie\_65, Caliburn\_65, Legacy\_65, BeardedLady\_66, SunsetPointe\_65
- Track 11 : Jash\_67
- Track 12 : South40\_65, Katalie\_65, RedBear\_66
- Track 13 : Zemlya\_69
- Track 14 : Asten\_66
- Track 15 : Toma\_69, Goby\_69
- Track 16 : Yasdnil\_66, Maneekul\_66
- Track 17 : Celeste\_69, Dattran\_70
- Track 18 : Danzina\_69
- Track 19 : Brataylor\_70
- Track 20 : Hippo\_66, BarryBee\_69
- Track 21 : EnochSoames\_69
- Track 22 : Nanodon\_67
- Track 23 : Marav\_69, Jevington\_69
- Track 24 : BartholomewSD\_73, TinaBelcher\_68, Alvy\_73, Thestral\_70, Bowden\_68, TrvxScott\_67
- Track 25 : Daudau\_68
- Track 26 : SqueakyClean\_69, Janus\_69, GirlDinner\_68
- Track 27 : Nishikigoi\_68, Amethyst\_67, Haizum\_67
- Track 28 : Loofah\_74
- Track 29 : Axiom\_70
- Track 30 : ELB20\_69
- Track 31 : Caelum\_71
- Track 32 : Pablito\_67
- Track 33 : Andris\_69

- Track 34 : Paolo\_72, Zainub\_72
- Track 35 : Tefunt\_67
- Track 36 : R4\_71
- Track 37 : Hank144\_70
- Track 38 : Diane\_68
- Track 39 : Issmi\_69
- Track 40 : Animus\_68
- Track 41 : Triumph\_70
- Track 42 : Puginator\_72
- Track 43 : Omar\_72
- Track 44 : Superstar\_74
- Track 45 : Paedore\_72
- Track 46 : Verabelle\_67, phiCAM\_61
- Track 47 : Alsaber\_64, Conan\_65, ElGato\_65, Kaine\_64, Provolone\_65, Pavo\_65, Sudan\_64
- Track 48 : SunkenRoot\_65, Verse\_65, Amela\_64
- Track 49 : Speedwell\_67
- Track 50 : Celery\_67
- Track 51 : Saftant\_62, Dexers\_62
- Track 52 : ZamZam\_64
- Track 53 : Jhitchelle\_61
- Track 54 : BroPlease\_67
- Track 55 : GreenWeasel\_69
- Track 56 : phiHau3\_69
- Track 57 : RegnumDei\_37
- Track 58 : Shagrat\_36
- Track 59 : Madraxi\_43
- Track 60 : CurlyFries\_37
- Track 61 : SFuller\_38
- Track 62 : REQ1\_07
- Track 63 : Jflix2\_37

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

The start number called the most often in the published annotations is 23, it was called in 103 of the 110 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_65, Alsaber\_64, Alvy\_73, Amela\_64, Amethyst\_67, Andris\_69, Animus\_68, Asten\_66, Axiom\_70, BarryBee\_69, BartholomewSD\_73, BeardedLady\_66, Bovely\_65, Bowden\_68, Brataylor\_70, BroPlease\_67, BryanRecycles\_67, Caelum\_71, Caliburn\_65, Celery\_67, Celeste\_69, Chucky\_66, Conan\_65, Danzina\_69, Dattran\_70, Daudau\_68, Dexers\_62, Diane\_68, Dwayne\_66, ELB20\_69, Eddasa\_68, Ejemplo\_64, ElGato\_65, Emaanora\_69, EnochSoames\_69, Esperer\_66, GirlDinner\_68, Goby\_69, Godpower\_69, GreenWeasel\_69, Haizum\_67, Hank144\_70, Hippo\_66, Hydra\_68, Indigo\_64, Issmi\_69, Izzy\_67, Janus\_69, Jevington\_69, Jhitchelle\_61, Kaine\_64, Katalie\_65, Lannister\_65, Legacy\_65, Leviticus\_66, Lika\_68, Loofah\_74, Lorelei\_68, Maneekul\_66, Marav\_69, Nabi\_69, Nanodon\_67, Nerdos\_64, Nishikigoi\_68, Oliynyk\_67, Omar\_72, Ozzie\_65, OzzyJ\_68, Pablito\_67, Paolo\_72, Pavo\_65,

Phettuccine\_65, Provolone\_65, Puginator\_72, R4\_71, Rana\_69, RedBear\_66, Rusticus\_67, Saftant\_62, SarahRose\_66, Snorlax\_66, South40\_65, Speedwell\_67, SqueakyClean\_69, Sudan\_64, Sujidade\_69, SunkenRoot\_65, SunsetPointe\_65, Superstar\_74, TAgePhighter\_68, Tefunt\_67, Thestral\_70, TinaBelcher\_68, Toma\_69, Triste\_67, Triumph\_70, TrvxScott\_67, TuanPN\_64, Unstoppable\_65, Verabelle\_67, Verse\_65, Werner\_66, Whatever\_66, Yasdnil\_66, Zainub\_72, ZamZam\_64, Zemlya\_69, phiCAM\_61, phiHau3\_69,

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

- Jash\_67, Paedore\_72,

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

- CurlyFries\_37, Jflix2\_37, Madraxi\_43, REQ1\_07, RegnumDei\_37, SFuller\_38, Shagrat\_36,

### Summary by start number:

Start 23:

- Found in 111 of 118 ( 94.1% ) of genes in pham
- Manual Annotations of this start: 103 of 110
- Called 98.2% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_65 (BD1), Alsaber\_64 (BD3), Alvy\_73 (BD2), Amela\_64 (BD3), Amethyst\_67 (BD2), Andris\_69 (BD2), Animus\_68 (BD2), Asten\_66 (BD1), Axiom\_70 (BD2), BarryBee\_69 (BD1), BartholomewSD\_73 (BD2), BeardedLady\_66 (BD1), Bovely\_65 (BD1), Bowden\_68 (BD2), Brataylor\_70 (BD1), BroPlease\_67 (BD4), BryanRecycles\_67 (BD1), Caelum\_71 (BD2), Caliburn\_65 (BD1), Celery\_67 (BD3), Celeste\_69 (BD1), Chucky\_66 (BD1), Conan\_65 (BD3), Danzina\_69 (BD1), Dattran\_70 (BD1), Daudau\_68 (BD2), Dexers\_62 (BD3), Diane\_68 (BD2), Dwayne\_66 (BD1), ELB20\_69 (BD2), Eddasa\_68 (BD1), Ejemplo\_64 (BD1), ElGato\_65 (BD3), Emaanora\_69 (BD1), EnochSoames\_69 (BD1), Esperer\_66 (BD1), GirlDinner\_68 (BD2), Goby\_69 (BD1), Godpower\_69 (BD1), GreenWeasel\_69 (BD4), Haizum\_67 (BD2), Hank144\_70 (BD2), Hippo\_66 (BD1), Hydra\_68 (BD1), Indigo\_64 (BD1), Issmi\_69 (BD2), Izzy\_67 (BD1), Janus\_69 (BD2), Jevington\_69 (BD2), Jhitchelle\_61 (BD3), Kaine\_64 (BD3), Katalie\_65 (BD1), Lannister\_65 (BD1), Legacy\_65 (BD1), Leviticus\_66 (BD1), Lika\_68 (BD1), Loofah\_74 (BD2), Lorelei\_68 (BD1), Maneekul\_66 (BD1), Marav\_69 (BD2), Nabi\_69 (BD1), Nanodon\_67 (BD1), Nerdos\_64 (BD1), Nishikigoi\_68 (BD2), Oliynyk\_67 (BD1), Omar\_72 (BD2), Ozzie\_65 (BD1), OzzyJ\_68 (BD1), Pablito\_67 (BD2), Paolo\_72 (BD2), Pavo\_65 (BD3), Phettuccine\_65 (BD1), Provolone\_65 (BD3), Puginator\_72 (BD2), R4\_71 (BD2), Rana\_69 (BD1), RedBear\_66 (BD1), Rusticus\_67 (BD1), Saftant\_62 (BD3), SarahRose\_66 (BD1), Snorlax\_66 (BD1), South40\_65 (BD1), Speedwell\_67 (BD3), SqueakyClean\_69 (BD2), Sudan\_64 (BD3), Sujidade\_69 (BD1), SunkenRoot\_65 (BD3), SunsetPointe\_65 (BD1), Superstar\_74 (BD2), TAgePhighter\_68 (BD1), Tefunt\_67 (BD2), Thestral\_70 (BD2), TinaBelcher\_68 (BD2), Toma\_69 (BD1), Triste\_67 (BD1), Triumph\_70 (BD2), TrvxScott\_67 (BD2), TuanPN\_64 (BD1), Unstoppable\_65 (BD1), Verabelle\_67 (BD3), Verse\_65 (BD3), Werner\_66 (BD1), Whatever\_66 (BD1), Yasdnil\_66 (BD1), Zainub\_72 (BD2), ZamZam\_64 (BD3), Zemlya\_69 (BD1), phiCAM\_61 (BD3), phiHau3\_69 (BD4),

Start 24:

- Found in 118 of 118 ( 100.0% ) of genes in pham
- Manual Annotations of this start: 7 of 110
- Called 7.6% of time when present

- Phage (with cluster) where this start called: CurlyFries\_37 (CF), Jash\_67 (BD1), Jflicx2\_37 (CF), Madraxi\_43 (CF), Paedore\_72 (BD2), REQ1\_07 (CF), RegnumDei\_37 (CF), SFuller\_38 (CF), Shagrat\_36 (CF),

### **Summary by clusters:**

There are 5 clusters represented in this pham: BD4, BD1, CF, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 23 was manually annotated 54 times for cluster BD1.
- Start number 24 was manually annotated 1 time for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 23 was manually annotated 32 times for cluster BD2.
- Start number 24 was manually annotated 1 time for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 23 was manually annotated 14 times for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 23 was manually annotated 3 times for cluster BD4.

Info for manual annotations of cluster CF:

- Start number 24 was manually annotated 5 times for cluster CF.

### **Gene Information:**

Gene: Aaronocolus\_65 Start: 44978, Stop: 44751, Start Num: 23

Candidate Starts for Aaronocolus\_65:

(9, 45149), (Start: 23 @44978 has 103 MA's), (Start: 24 @44969 has 7 MA's), (28, 44945), (37, 44873), (38, 44870), (42, 44828),

Gene: Alsaber\_64 Start: 43086, Stop: 42862, Start Num: 23

Candidate Starts for Alsaber\_64:

(Start: 23 @43086 has 103 MA's), (Start: 24 @43077 has 7 MA's), (37, 42981), (56, 42867),

Gene: Alvy\_73 Start: 46741, Stop: 46529, Start Num: 23

Candidate Starts for Alvy\_73:

(Start: 23 @46741 has 103 MA's), (Start: 24 @46732 has 7 MA's), (28, 46708), (32, 46672), (33, 46669), (37, 46636), (44, 46573), (46, 46555),

Gene: Amela\_64 Start: 44073, Stop: 43849, Start Num: 23

Candidate Starts for Amela\_64:

(21, 44109), (Start: 23 @44073 has 103 MA's), (Start: 24 @44064 has 7 MA's), (37, 43968),

Gene: Amethyst\_67 Start: 43769, Stop: 43539, Start Num: 23

Candidate Starts for Amethyst\_67:

(11, 43928), (Start: 23 @43769 has 103 MA's), (Start: 24 @43760 has 7 MA's), (37, 43664), (53, 43562),

Gene: Andris\_69 Start: 44658, Stop: 44446, Start Num: 23

Candidate Starts for Andris\_69:

(11, 44817), (Start: 23 @44658 has 103 MA's), (Start: 24 @44649 has 7 MA's), (26, 44637), (28, 44625), (33, 44586), (37, 44553), (46, 44472),

Gene: Animus\_68 Start: 45712, Stop: 45500, Start Num: 23

Candidate Starts for Animus\_68:

(13, 45829), (15, 45802), (Start: 23 @45712 has 103 MA's), (Start: 24 @45703 has 7 MA's), (25, 45694), (28, 45679), (32, 45643), (33, 45640), (37, 45607), (44, 45544), (46, 45526), (48, 45520),

Gene: Asten\_66 Start: 47300, Stop: 47097, Start Num: 23

Candidate Starts for Asten\_66:

(Start: 23 @47300 has 103 MA's), (Start: 24 @47291 has 7 MA's), (26, 47279), (42, 47150), (47, 47111),

Gene: Axiom\_70 Start: 45406, Stop: 45194, Start Num: 23

Candidate Starts for Axiom\_70:

(Start: 23 @45406 has 103 MA's), (Start: 24 @45397 has 7 MA's), (28, 45373), (32, 45337), (33, 45334), (37, 45301), (42, 45256), (44, 45238), (46, 45220), (48, 45214),

Gene: BarryBee\_69 Start: 47274, Stop: 47071, Start Num: 23

Candidate Starts for BarryBee\_69:

(Start: 23 @47274 has 103 MA's), (Start: 24 @47265 has 7 MA's), (26, 47253), (47, 47085),

Gene: BartholomewSD\_73 Start: 45860, Stop: 45648, Start Num: 23

Candidate Starts for BartholomewSD\_73:

(Start: 23 @45860 has 103 MA's), (Start: 24 @45851 has 7 MA's), (28, 45827), (32, 45791), (33, 45788), (37, 45755), (44, 45692), (46, 45674),

Gene: BeardedLady\_66 Start: 45361, Stop: 45134, Start Num: 23

Candidate Starts for BeardedLady\_66:

(Start: 23 @45361 has 103 MA's), (Start: 24 @45352 has 7 MA's), (28, 45328), (37, 45256), (38, 45253), (42, 45211),

Gene: Bovely\_65 Start: 44981, Stop: 44754, Start Num: 23

Candidate Starts for Bovely\_65:

(9, 45152), (Start: 23 @44981 has 103 MA's), (Start: 24 @44972 has 7 MA's), (28, 44948), (37, 44876), (38, 44873), (42, 44831),

Gene: Bowden\_68 Start: 46430, Stop: 46218, Start Num: 23

Candidate Starts for Bowden\_68:

(Start: 23 @46430 has 103 MA's), (Start: 24 @46421 has 7 MA's), (28, 46397), (32, 46361), (33, 46358), (37, 46325), (44, 46262), (46, 46244),

Gene: Brataylor\_70 Start: 46827, Stop: 46624, Start Num: 23

Candidate Starts for Brataylor\_70:

(Start: 23 @46827 has 103 MA's), (Start: 24 @46818 has 7 MA's), (26, 46806),

Gene: BroPlease\_67 Start: 44201, Stop: 43980, Start Num: 23

Candidate Starts for BroPlease\_67:

(16, 44273), (19, 44249), (Start: 23 @44201 has 103 MA's), (Start: 24 @44192 has 7 MA's), (37, 44096), (47, 44012),

Gene: BryanRecycles\_67 Start: 45476, Stop: 45249, Start Num: 23

Candidate Starts for BryanRecycles\_67:

(9, 45647), (Start: 23 @45476 has 103 MA's), (Start: 24 @45467 has 7 MA's), (28, 45443), (37, 45371), (38, 45368), (42, 45326),

Gene: Caelum\_71 Start: 44728, Stop: 44495, Start Num: 23

Candidate Starts for Caelum\_71:

(Start: 23 @44728 has 103 MA's), (Start: 24 @44719 has 7 MA's), (30, 44668), (31, 44665), (34, 44650), (40, 44590), (43, 44575), (53, 44521),

Gene: Caliburn\_65 Start: 45369, Stop: 45142, Start Num: 23

Candidate Starts for Caliburn\_65:

(Start: 23 @45369 has 103 MA's), (Start: 24 @45360 has 7 MA's), (28, 45336), (37, 45264), (38, 45261), (42, 45219),

Gene: Celery\_67 Start: 42998, Stop: 42777, Start Num: 23

Candidate Starts for Celery\_67:

(Start: 23 @42998 has 103 MA's), (Start: 24 @42989 has 7 MA's), (28, 42965), (37, 42893), (42, 42848), (56, 42782),

Gene: Celeste\_69 Start: 46292, Stop: 46089, Start Num: 23

Candidate Starts for Celeste\_69:

(Start: 23 @46292 has 103 MA's), (Start: 24 @46283 has 7 MA's), (26, 46271),

Gene: Chucky\_66 Start: 47335, Stop: 47132, Start Num: 23

Candidate Starts for Chucky\_66:

(9, 47503), (Start: 23 @47335 has 103 MA's), (Start: 24 @47326 has 7 MA's), (26, 47314), (47, 47146),

Gene: Conan\_65 Start: 43352, Stop: 43128, Start Num: 23

Candidate Starts for Conan\_65:

(Start: 23 @43352 has 103 MA's), (Start: 24 @43343 has 7 MA's), (37, 43247), (56, 43133),

Gene: CurlyFries\_37 Start: 29430, Stop: 29251, Start Num: 24

Candidate Starts for CurlyFries\_37:

(Start: 24 @29430 has 7 MA's), (28, 29406), (36, 29346),

Gene: Danzina\_69 Start: 46541, Stop: 46338, Start Num: 23

Candidate Starts for Danzina\_69:

(22, 46550), (Start: 23 @46541 has 103 MA's), (Start: 24 @46532 has 7 MA's),

Gene: Dattran\_70 Start: 46745, Stop: 46542, Start Num: 23

Candidate Starts for Dattran\_70:

(Start: 23 @46745 has 103 MA's), (Start: 24 @46736 has 7 MA's), (26, 46724),

Gene: Daudau\_68 Start: 44304, Stop: 44071, Start Num: 23

Candidate Starts for Daudau\_68:

(Start: 23 @44304 has 103 MA's), (Start: 24 @44295 has 7 MA's), (28, 44271), (37, 44199), (53, 44097), (55, 44085),

Gene: Dexers\_62 Start: 43326, Stop: 43102, Start Num: 23

Candidate Starts for Dexers\_62:

(21, 43359), (Start: 23 @43326 has 103 MA's), (Start: 24 @43317 has 7 MA's), (37, 43221), (56, 43107),

Gene: Diane\_68 Start: 44854, Stop: 44624, Start Num: 23

Candidate Starts for Diane\_68:

(1, 45382), (2, 45376), (3, 45364), (4, 45286), (5, 45280), (11, 45013), (12, 44992), (Start: 23 @44854 has 103 MA's), (Start: 24 @44845 has 7 MA's), (37, 44749), (53, 44647),

Gene: Dwayne\_66 Start: 47323, Stop: 47120, Start Num: 23

Candidate Starts for Dwayne\_66:

(9, 47491), (Start: 23 @47323 has 103 MA's), (Start: 24 @47314 has 7 MA's), (26, 47302), (47, 47134),

Gene: ELB20\_69 Start: 45139, Stop: 44912, Start Num: 23

Candidate Starts for ELB20\_69:

(Start: 23 @45139 has 103 MA's), (Start: 24 @45130 has 7 MA's), (28, 45106), (37, 45034), (41, 44992), (42, 44989), (53, 44932), (55, 44920),

Gene: Eddasa\_68 Start: 46015, Stop: 45788, Start Num: 23

Candidate Starts for Eddasa\_68:

(9, 46186), (Start: 23 @46015 has 103 MA's), (Start: 24 @46006 has 7 MA's), (28, 45982), (37, 45910), (38, 45907), (42, 45865),

Gene: Ejemplo\_64 Start: 47261, Stop: 47058, Start Num: 23

Candidate Starts for Ejemplo\_64:

(9, 47429), (Start: 23 @47261 has 103 MA's), (Start: 24 @47252 has 7 MA's), (26, 47240), (47, 47072),

Gene: ElGato\_65 Start: 43224, Stop: 43000, Start Num: 23

Candidate Starts for ElGato\_65:

(Start: 23 @43224 has 103 MA's), (Start: 24 @43215 has 7 MA's), (37, 43119), (56, 43005),

Gene: Emaanora\_69 Start: 47247, Stop: 47044, Start Num: 23

Candidate Starts for Emaanora\_69:

(9, 47415), (Start: 23 @47247 has 103 MA's), (Start: 24 @47238 has 7 MA's), (26, 47226), (47, 47058),

Gene: EnochSoames\_69 Start: 45273, Stop: 45046, Start Num: 23

Candidate Starts for EnochSoames\_69:

(9, 45444), (Start: 23 @45273 has 103 MA's), (Start: 24 @45264 has 7 MA's), (28, 45240), (37, 45168), (38, 45165), (42, 45123),

Gene: Esperer\_66 Start: 45324, Stop: 45097, Start Num: 23

Candidate Starts for Esperer\_66:

(9, 45495), (Start: 23 @45324 has 103 MA's), (Start: 24 @45315 has 7 MA's), (28, 45291), (37, 45219), (38, 45216), (42, 45174),

Gene: GirlDinner\_68 Start: 45204, Stop: 44992, Start Num: 23

Candidate Starts for GirlDinner\_68:

(Start: 23 @45204 has 103 MA's), (Start: 24 @45195 has 7 MA's), (25, 45186), (28, 45171), (32, 45135), (33, 45132), (37, 45099), (44, 45036), (46, 45018), (48, 45012),

Gene: Goby\_69 Start: 47162, Stop: 46959, Start Num: 23

Candidate Starts for Goby\_69:

(7, 47447), (8, 47429), (9, 47336), (Start: 23 @47162 has 103 MA's), (Start: 24 @47153 has 7 MA's), (26, 47141), (47, 46973),

Gene: Godpower\_69 Start: 46454, Stop: 46251, Start Num: 23

Candidate Starts for Godpower\_69:

(7, 46739), (8, 46721), (Start: 23 @46454 has 103 MA's), (Start: 24 @46445 has 7 MA's), (26, 46433), (47, 46265),

Gene: GreenWeasel\_69 Start: 44206, Stop: 43985, Start Num: 23

Candidate Starts for GreenWeasel\_69:

(Start: 23 @44206 has 103 MA's), (Start: 24 @44197 has 7 MA's), (37, 44101), (47, 44017),

Gene: Haizum\_67 Start: 44577, Stop: 44347, Start Num: 23

Candidate Starts for Haizum\_67:

(11, 44736), (Start: 23 @44577 has 103 MA's), (Start: 24 @44568 has 7 MA's), (37, 44472), (53, 44370),

Gene: Hank144\_70 Start: 45408, Stop: 45175, Start Num: 23

Candidate Starts for Hank144\_70:

(Start: 23 @45408 has 103 MA's), (Start: 24 @45399 has 7 MA's), (28, 45375), (37, 45303), (53, 45201), (55, 45189), (56, 45183),

Gene: Hippo\_66 Start: 47310, Stop: 47107, Start Num: 23

Candidate Starts for Hippo\_66:

(Start: 23 @47310 has 103 MA's), (Start: 24 @47301 has 7 MA's), (26, 47289), (47, 47121),

Gene: Hydra\_68 Start: 46171, Stop: 45944, Start Num: 23

Candidate Starts for Hydra\_68:

(Start: 23 @46171 has 103 MA's), (Start: 24 @46162 has 7 MA's), (28, 46138), (37, 46066), (42, 46021),

Gene: Indigo\_64 Start: 44974, Stop: 44747, Start Num: 23

Candidate Starts for Indigo\_64:

(9, 45145), (Start: 23 @44974 has 103 MA's), (Start: 24 @44965 has 7 MA's), (28, 44941), (37, 44869), (38, 44866), (42, 44824),

Gene: Issmi\_69 Start: 45371, Stop: 45138, Start Num: 23

Candidate Starts for Issmi\_69:

(Start: 23 @45371 has 103 MA's), (Start: 24 @45362 has 7 MA's), (29, 45320), (37, 45266), (53, 45164), (55, 45152),

Gene: Izzy\_67 Start: 45523, Stop: 45296, Start Num: 23

Candidate Starts for Izzy\_67:

(9, 45694), (Start: 23 @45523 has 103 MA's), (Start: 24 @45514 has 7 MA's), (28, 45490), (37, 45418), (38, 45415), (42, 45373),

Gene: Janus\_69 Start: 45544, Stop: 45332, Start Num: 23

Candidate Starts for Janus\_69:

(Start: 23 @45544 has 103 MA's), (Start: 24 @45535 has 7 MA's), (25, 45526), (28, 45511), (32, 45475), (33, 45472), (37, 45439), (44, 45376), (46, 45358), (48, 45352),

Gene: Jash\_67 Start: 45467, Stop: 45249, Start Num: 24

Candidate Starts for Jash\_67:

(9, 45647), (Start: 23 @45476 has 103 MA's), (Start: 24 @45467 has 7 MA's), (28, 45443), (37, 45371), (38, 45368), (42, 45326),

Gene: Jevington\_69 Start: 43739, Stop: 43506, Start Num: 23

Candidate Starts for Jevington\_69:

(Start: 23 @43739 has 103 MA's), (Start: 24 @43730 has 7 MA's), (37, 43634), (53, 43532),

Gene: Jflix2\_37 Start: 30409, Stop: 30200, Start Num: 24

Candidate Starts for Jflix2\_37:

(6, 30841), (Start: 24 @30409 has 7 MA's), (34, 30340), (38, 30310), (39, 30301), (52, 30217),

Gene: Jhitchelle\_61 Start: 42609, Stop: 42379, Start Num: 23

Candidate Starts for Jhitchelle\_61:

(Start: 23 @42609 has 103 MA's), (Start: 24 @42600 has 7 MA's), (28, 42576), (32, 42540), (37, 42504), (55, 42390), (56, 42384),

Gene: Kaine\_64 Start: 43110, Stop: 42886, Start Num: 23

Candidate Starts for Kaine\_64:

(Start: 23 @43110 has 103 MA's), (Start: 24 @43101 has 7 MA's), (37, 43005), (56, 42891),

Gene: Katalie\_65 Start: 47046, Stop: 46843, Start Num: 23

Candidate Starts for Katalie\_65:

(Start: 23 @47046 has 103 MA's), (Start: 24 @47037 has 7 MA's), (26, 47025), (33, 46974), (47, 46857),

Gene: Lannister\_65 Start: 45800, Stop: 45597, Start Num: 23

Candidate Starts for Lannister\_65:

(Start: 23 @45800 has 103 MA's), (Start: 24 @45791 has 7 MA's), (26, 45779), (37, 45695),

Gene: Legacy\_65 Start: 45360, Stop: 45133, Start Num: 23

Candidate Starts for Legacy\_65:

(Start: 23 @45360 has 103 MA's), (Start: 24 @45351 has 7 MA's), (28, 45327), (37, 45255), (38, 45252), (42, 45210),

Gene: Leviticus\_66 Start: 45511, Stop: 45284, Start Num: 23

Candidate Starts for Leviticus\_66:

(9, 45682), (Start: 23 @45511 has 103 MA's), (Start: 24 @45502 has 7 MA's), (28, 45478), (37, 45406), (38, 45403), (42, 45361),

Gene: Lika\_68 Start: 47007, Stop: 46804, Start Num: 23

Candidate Starts for Lika\_68:

(7, 47292), (8, 47274), (Start: 23 @47007 has 103 MA's), (Start: 24 @46998 has 7 MA's), (26, 46986), (47, 46818),

Gene: Loofah\_74 Start: 46120, Stop: 45893, Start Num: 23

Candidate Starts for Loofah\_74:

(9, 46303), (Start: 23 @46120 has 103 MA's), (Start: 24 @46111 has 7 MA's), (37, 46015), (38, 46012), (42, 45970), (45, 45949), (53, 45913), (55, 45901),

Gene: Lorelei\_68 Start: 46298, Stop: 46095, Start Num: 23

Candidate Starts for Lorelei\_68:

(7, 46583), (8, 46565), (17, 46364), (Start: 23 @46298 has 103 MA's), (Start: 24 @46289 has 7 MA's), (26, 46277),

Gene: Madraxi\_43 Start: 33621, Stop: 33412, Start Num: 24

Candidate Starts for Madraxi\_43:

(Start: 24 @33621 has 7 MA's), (34, 33552), (38, 33522), (39, 33513), (49, 33435), (52, 33429), (54, 33417),

Gene: Maneekul\_66 Start: 47340, Stop: 47137, Start Num: 23

Candidate Starts for Maneekul\_66:

(9, 47508), (Start: 23 @47340 has 103 MA's), (Start: 24 @47331 has 7 MA's), (26, 47319), (47, 47151),

Gene: Marav\_69 Start: 43726, Stop: 43493, Start Num: 23

Candidate Starts for Marav\_69:

(Start: 23 @43726 has 103 MA's), (Start: 24 @43717 has 7 MA's), (37, 43621), (53, 43519),

Gene: Nabi\_69 Start: 46867, Stop: 46664, Start Num: 23

Candidate Starts for Nabi\_69:

(7, 47152), (8, 47134), (Start: 23 @46867 has 103 MA's), (Start: 24 @46858 has 7 MA's), (26, 46846), (47, 46678),

Gene: Nanodon\_67 Start: 45729, Stop: 45526, Start Num: 23

Candidate Starts for Nanodon\_67:

(Start: 23 @45729 has 103 MA's), (Start: 24 @45720 has 7 MA's), (26, 45708), (27, 45699), (37, 45624),

Gene: Nerdos\_64 Start: 44973, Stop: 44746, Start Num: 23

Candidate Starts for Nerdos\_64:

(9, 45144), (Start: 23 @44973 has 103 MA's), (Start: 24 @44964 has 7 MA's), (28, 44940), (37, 44868), (38, 44865), (42, 44823),

Gene: Nishikigoi\_68 Start: 44577, Stop: 44347, Start Num: 23

Candidate Starts for Nishikigoi\_68:

(11, 44736), (Start: 23 @44577 has 103 MA's), (Start: 24 @44568 has 7 MA's), (37, 44472), (53, 44370),

Gene: Oliynyk\_67 Start: 45476, Stop: 45249, Start Num: 23

Candidate Starts for Oliynyk\_67:

(9, 45647), (Start: 23 @45476 has 103 MA's), (Start: 24 @45467 has 7 MA's), (28, 45443), (37, 45371), (38, 45368), (42, 45326),

Gene: Omar\_72 Start: 43507, Stop: 43280, Start Num: 23

Candidate Starts for Omar\_72:

(Start: 23 @43507 has 103 MA's), (Start: 24 @43498 has 7 MA's), (42, 43357), (44, 43339), (53, 43300),

Gene: Ozzie\_65 Start: 45369, Stop: 45142, Start Num: 23

Candidate Starts for Ozzie\_65:

(Start: 23 @45369 has 103 MA's), (Start: 24 @45360 has 7 MA's), (28, 45336), (37, 45264), (38, 45261), (42, 45219),

Gene: OzzyJ\_68 Start: 47243, Stop: 47040, Start Num: 23

Candidate Starts for OzzyJ\_68:

(Start: 23 @47243 has 103 MA's), (Start: 24 @47234 has 7 MA's), (26, 47222),

Gene: Pablito\_67 Start: 43979, Stop: 43767, Start Num: 23

Candidate Starts for Pablito\_67:

(11, 44138), (12, 44117), (Start: 23 @43979 has 103 MA's), (Start: 24 @43970 has 7 MA's), (28, 43946), (37, 43874), (51, 43781),

Gene: Paedore\_72 Start: 46477, Stop: 46259, Start Num: 24  
Candidate Starts for Paedore\_72:  
(9, 46669), (Start: 23 @46486 has 103 MA's), (Start: 24 @46477 has 7 MA's), (37, 46381), (38, 46378),  
(42, 46336), (45, 46315), (53, 46279), (55, 46267),

Gene: Paolo\_72 Start: 45420, Stop: 45193, Start Num: 23  
Candidate Starts for Paolo\_72:  
(18, 45468), (Start: 23 @45420 has 103 MA's), (Start: 24 @45411 has 7 MA's), (36, 45327), (37,  
45315), (53, 45213),

Gene: Pavo\_65 Start: 43295, Stop: 43071, Start Num: 23  
Candidate Starts for Pavo\_65:  
(Start: 23 @43295 has 103 MA's), (Start: 24 @43286 has 7 MA's), (37, 43190), (56, 43076),

Gene: Phettuccine\_65 Start: 44974, Stop: 44747, Start Num: 23  
Candidate Starts for Phettuccine\_65:  
(9, 45145), (Start: 23 @44974 has 103 MA's), (Start: 24 @44965 has 7 MA's), (28, 44941), (37, 44869),  
(38, 44866), (42, 44824),

Gene: Provolone\_65 Start: 43436, Stop: 43212, Start Num: 23  
Candidate Starts for Provolone\_65:  
(Start: 23 @43436 has 103 MA's), (Start: 24 @43427 has 7 MA's), (37, 43331), (56, 43217),

Gene: Puginator\_72 Start: 45467, Stop: 45240, Start Num: 23  
Candidate Starts for Puginator\_72:  
(Start: 23 @45467 has 103 MA's), (Start: 24 @45458 has 7 MA's), (37, 45362), (42, 45317), (53,  
45260),

Gene: R4\_71 Start: 45299, Stop: 45072, Start Num: 23  
Candidate Starts for R4\_71:  
(9, 45482), (14, 45401), (Start: 23 @45299 has 103 MA's), (Start: 24 @45290 has 7 MA's), (28, 45266),  
(37, 45194), (41, 45152), (42, 45149), (53, 45092), (55, 45080),

Gene: REQ1\_07 Start: 2205, Stop: 1996, Start Num: 24  
Candidate Starts for REQ1\_07:  
(Start: 24 @2205 has 7 MA's), (25, 2196), (35, 2124), (38, 2106),

Gene: Rana\_69 Start: 46720, Stop: 46517, Start Num: 23  
Candidate Starts for Rana\_69:  
(7, 47005), (8, 46987), (17, 46786), (Start: 23 @46720 has 103 MA's), (Start: 24 @46711 has 7 MA's),  
(26, 46699),

Gene: RedBear\_66 Start: 47046, Stop: 46843, Start Num: 23  
Candidate Starts for RedBear\_66:  
(Start: 23 @47046 has 103 MA's), (Start: 24 @47037 has 7 MA's), (26, 47025), (33, 46974), (47,  
46857),

Gene: RegnumDei\_37 Start: 30011, Stop: 29808, Start Num: 24  
Candidate Starts for RegnumDei\_37:  
(Start: 24 @30011 has 7 MA's), (28, 29987), (50, 29825),

Gene: Rusticus\_67 Start: 45476, Stop: 45249, Start Num: 23  
Candidate Starts for Rusticus\_67:

(9, 45647), (Start: 23 @45476 has 103 MA's), (Start: 24 @45467 has 7 MA's), (28, 45443), (37, 45371), (38, 45368), (42, 45326),

Gene: SFuller\_38 Start: 30771, Stop: 30562, Start Num: 24

Candidate Starts for SFuller\_38:

(Start: 24 @30771 has 7 MA's), (26, 30759), (34, 30702), (38, 30672), (39, 30663), (52, 30579),

Gene: Saftant\_62 Start: 43176, Stop: 42952, Start Num: 23

Candidate Starts for Saftant\_62:

(21, 43209), (Start: 23 @43176 has 103 MA's), (Start: 24 @43167 has 7 MA's), (37, 43071), (56, 42957),

Gene: SarahRose\_66 Start: 47310, Stop: 47107, Start Num: 23

Candidate Starts for SarahRose\_66:

(Start: 23 @47310 has 103 MA's), (Start: 24 @47301 has 7 MA's), (26, 47289), (36, 47217), (42, 47160), (47, 47121),

Gene: Shagrat\_36 Start: 30057, Stop: 29884, Start Num: 24

Candidate Starts for Shagrat\_36:

(10, 30225), (20, 30114), (Start: 24 @30057 has 7 MA's), (28, 30033),

Gene: Snorlax\_66 Start: 47335, Stop: 47132, Start Num: 23

Candidate Starts for Snorlax\_66:

(Start: 23 @47335 has 103 MA's), (Start: 24 @47326 has 7 MA's), (26, 47314), (36, 47242), (42, 47185), (47, 47146),

Gene: South40\_65 Start: 47046, Stop: 46843, Start Num: 23

Candidate Starts for South40\_65:

(Start: 23 @47046 has 103 MA's), (Start: 24 @47037 has 7 MA's), (26, 47025), (33, 46974), (47, 46857),

Gene: Speedwell\_67 Start: 44221, Stop: 43997, Start Num: 23

Candidate Starts for Speedwell\_67:

(21, 44254), (Start: 23 @44221 has 103 MA's), (Start: 24 @44212 has 7 MA's), (37, 44116), (56, 44002),

Gene: SqueakyClean\_69 Start: 45722, Stop: 45510, Start Num: 23

Candidate Starts for SqueakyClean\_69:

(Start: 23 @45722 has 103 MA's), (Start: 24 @45713 has 7 MA's), (25, 45704), (28, 45689), (32, 45653), (33, 45650), (37, 45617), (44, 45554), (46, 45536), (48, 45530),

Gene: Sudan\_64 Start: 43093, Stop: 42869, Start Num: 23

Candidate Starts for Sudan\_64:

(Start: 23 @43093 has 103 MA's), (Start: 24 @43084 has 7 MA's), (37, 42988), (56, 42874),

Gene: Sujidade\_69 Start: 47304, Stop: 47101, Start Num: 23

Candidate Starts for Sujidade\_69:

(7, 47589), (8, 47571), (Start: 23 @47304 has 103 MA's), (Start: 24 @47295 has 7 MA's), (26, 47283), (47, 47115),

Gene: SunkenRoot\_65 Start: 43800, Stop: 43576, Start Num: 23

Candidate Starts for SunkenRoot\_65:

(21, 43836), (Start: 23 @43800 has 103 MA's), (Start: 24 @43791 has 7 MA's), (37, 43695),

Gene: SunsetPointe\_65 Start: 45376, Stop: 45149, Start Num: 23  
Candidate Starts for SunsetPointe\_65:  
(Start: 23 @45376 has 103 MA's), (Start: 24 @45367 has 7 MA's), (28, 45343), (37, 45271), (38, 45268), (42, 45226),

Gene: Superstar\_74 Start: 44742, Stop: 44530, Start Num: 23  
Candidate Starts for Superstar\_74:  
(11, 44901), (Start: 23 @44742 has 103 MA's), (Start: 24 @44733 has 7 MA's), (28, 44709), (37, 44637), (42, 44592), (51, 44544),

Gene: TagePighther\_68 Start: 47310, Stop: 47107, Start Num: 23  
Candidate Starts for TagePighther\_68:  
(9, 47478), (Start: 23 @47310 has 103 MA's), (Start: 24 @47301 has 7 MA's), (26, 47289), (47, 47121),

Gene: Tefunt\_67 Start: 44491, Stop: 44261, Start Num: 23  
Candidate Starts for Tefunt\_67:  
(11, 44650), (Start: 23 @44491 has 103 MA's), (Start: 24 @44482 has 7 MA's), (37, 44386), (53, 44284), (55, 44272),

Gene: Thestral\_70 Start: 46457, Stop: 46245, Start Num: 23  
Candidate Starts for Thestral\_70:  
(Start: 23 @46457 has 103 MA's), (Start: 24 @46448 has 7 MA's), (28, 46424), (32, 46388), (33, 46385), (37, 46352), (44, 46289), (46, 46271),

Gene: TinaBelcher\_68 Start: 46319, Stop: 46107, Start Num: 23  
Candidate Starts for TinaBelcher\_68:  
(Start: 23 @46319 has 103 MA's), (Start: 24 @46310 has 7 MA's), (28, 46286), (32, 46250), (33, 46247), (37, 46214), (44, 46151), (46, 46133),

Gene: Toma\_69 Start: 47165, Stop: 46962, Start Num: 23  
Candidate Starts for Toma\_69:  
(7, 47450), (8, 47432), (9, 47339), (Start: 23 @47165 has 103 MA's), (Start: 24 @47156 has 7 MA's), (26, 47144), (47, 46976),

Gene: Triste\_67 Start: 47309, Stop: 47106, Start Num: 23  
Candidate Starts for Triste\_67:  
(9, 47477), (Start: 23 @47309 has 103 MA's), (Start: 24 @47300 has 7 MA's), (26, 47288), (47, 47120),

Gene: Triumph\_70 Start: 45144, Stop: 44932, Start Num: 23  
Candidate Starts for Triumph\_70:  
(Start: 23 @45144 has 103 MA's), (Start: 24 @45135 has 7 MA's), (28, 45111), (33, 45072), (37, 45039), (44, 44976), (46, 44958), (48, 44952), (51, 44946),

Gene: TrvxScott\_67 Start: 46424, Stop: 46212, Start Num: 23  
Candidate Starts for TrvxScott\_67:  
(Start: 23 @46424 has 103 MA's), (Start: 24 @46415 has 7 MA's), (28, 46391), (32, 46355), (33, 46352), (37, 46319), (44, 46256), (46, 46238),

Gene: TuanPN\_64 Start: 47261, Stop: 47058, Start Num: 23  
Candidate Starts for TuanPN\_64:  
(9, 47429), (Start: 23 @47261 has 103 MA's), (Start: 24 @47252 has 7 MA's), (26, 47240), (47, 47072),

Gene: Unstoppable\_65 Start: 44972, Stop: 44745, Start Num: 23  
Candidate Starts for Unstoppable\_65:  
(9, 45143), (Start: 23 @44972 has 103 MA's), (Start: 24 @44963 has 7 MA's), (28, 44939), (37, 44867),  
(38, 44864), (42, 44822),

Gene: Verabelle\_67 Start: 42771, Stop: 42547, Start Num: 23  
Candidate Starts for Verabelle\_67:  
(Start: 23 @42771 has 103 MA's), (Start: 24 @42762 has 7 MA's), (37, 42666), (56, 42552),

Gene: Verse\_65 Start: 44064, Stop: 43840, Start Num: 23  
Candidate Starts for Verse\_65:  
(21, 44100), (Start: 23 @44064 has 103 MA's), (Start: 24 @44055 has 7 MA's), (37, 43959),

Gene: Werner\_66 Start: 47307, Stop: 47104, Start Num: 23  
Candidate Starts for Werner\_66:  
(9, 47475), (Start: 23 @47307 has 103 MA's), (Start: 24 @47298 has 7 MA's), (26, 47286), (47, 47118),

Gene: Whatever\_66 Start: 47332, Stop: 47129, Start Num: 23  
Candidate Starts for Whatever\_66:  
(9, 47500), (Start: 23 @47332 has 103 MA's), (Start: 24 @47323 has 7 MA's), (26, 47311), (47, 47143),

Gene: Yasdniil\_66 Start: 47359, Stop: 47156, Start Num: 23  
Candidate Starts for Yasdniil\_66:  
(9, 47527), (Start: 23 @47359 has 103 MA's), (Start: 24 @47350 has 7 MA's), (26, 47338), (47, 47170),

Gene: Zainub\_72 Start: 45394, Stop: 45167, Start Num: 23  
Candidate Starts for Zainub\_72:  
(18, 45442), (Start: 23 @45394 has 103 MA's), (Start: 24 @45385 has 7 MA's), (36, 45301), (37,  
45289), (53, 45187),

Gene: ZamZam\_64 Start: 43519, Stop: 43295, Start Num: 23  
Candidate Starts for ZamZam\_64:  
(Start: 23 @43519 has 103 MA's), (Start: 24 @43510 has 7 MA's), (29, 43468), (37, 43414), (56,  
43300),

Gene: Zemlya\_69 Start: 46846, Stop: 46643, Start Num: 23  
Candidate Starts for Zemlya\_69:  
(22, 46855), (Start: 23 @46846 has 103 MA's), (Start: 24 @46837 has 7 MA's), (26, 46825),

Gene: phiCAM\_61 Start: 44832, Stop: 44608, Start Num: 23  
Candidate Starts for phiCAM\_61:  
(Start: 23 @44832 has 103 MA's), (Start: 24 @44823 has 7 MA's), (37, 44727), (56, 44613),

Gene: phiHau3\_69 Start: 44634, Stop: 44413, Start Num: 23  
Candidate Starts for phiHau3\_69:  
(Start: 23 @44634 has 103 MA's), (Start: 24 @44625 has 7 MA's), (37, 44529), (47, 44445),