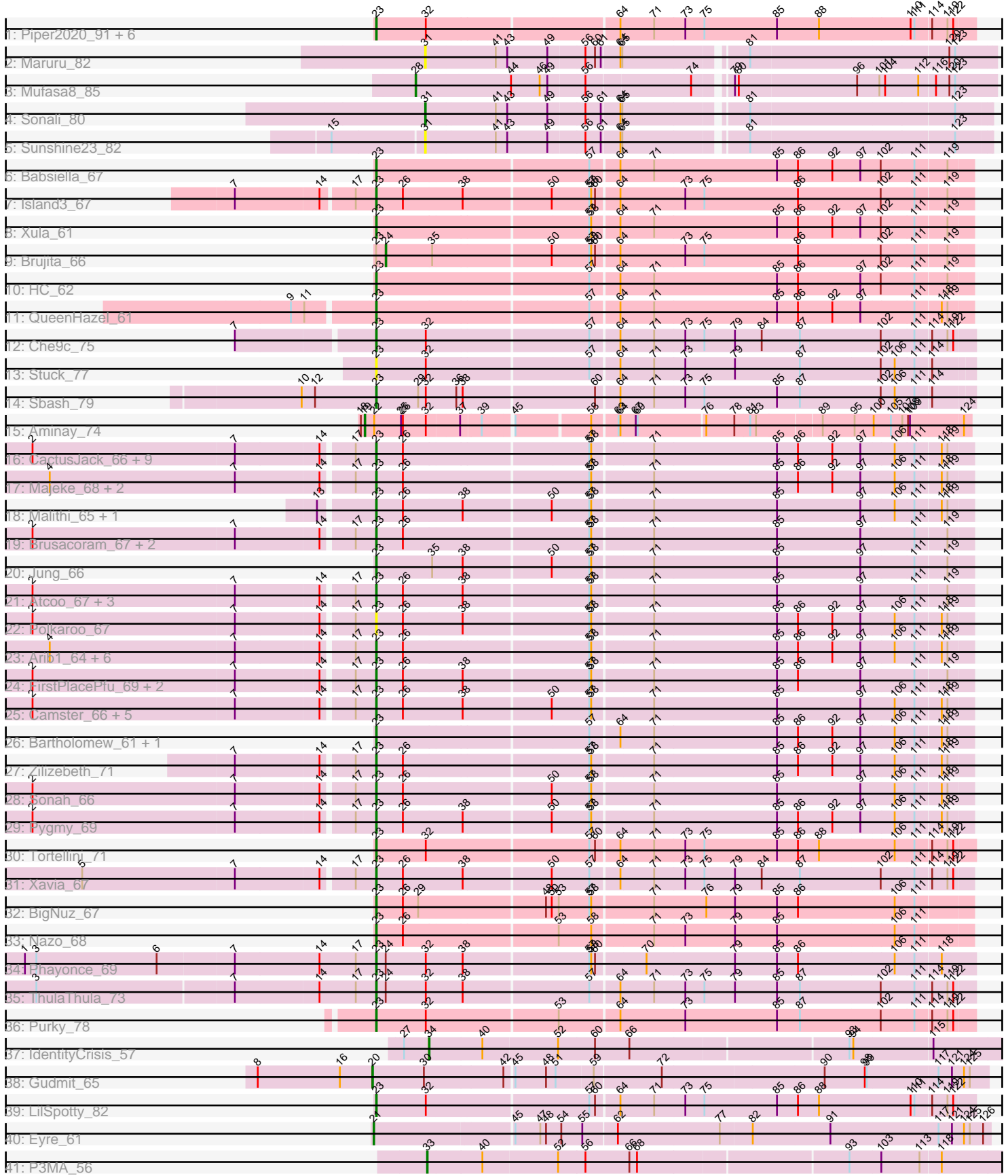


Pham 216099



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 216099 Report

This analysis was run 02/22/25 on database version 588.

Pham number 216099 has 78 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Piper2020\_91, ChickenDinner\_90, TootsiePop\_86, Awesomesauce\_87, Misha28\_86, Aloeri\_90, DocMcStuffins\_84
- Track 2 : Maruru\_82
- Track 3 : Mufasa8\_85
- Track 4 : Sonali\_80
- Track 5 : Sunshine23\_82
- Track 6 : Babsiella\_67
- Track 7 : Island3\_67
- Track 8 : Xula\_61
- Track 9 : Brujita\_66
- Track 10 : HC\_62
- Track 11 : QueenHazel\_61
- Track 12 : Che9c\_75
- Track 13 : Stuck\_77
- Track 14 : Sbash\_79
- Track 15 : Aminay\_74
- Track 16 : CactusJack\_66, Juniormint\_63, Glaske\_65, Megiddo\_65, Willsammy\_67, Jebeks\_66, KilKor\_66, StressBall\_65, Phalm\_66, Gavriela\_65
- Track 17 : Majeke\_68, Mangethe\_68, Phegasus\_68
- Track 18 : Malithi\_65, Phineas\_66
- Track 19 : Brusacoram\_67, Vidya\_64, Thespis\_67
- Track 20 : Jung\_66
- Track 21 : Atcoo\_67, Bhagsy\_70, GreaseLightnin\_70, StevieRay\_70
- Track 22 : Polkaroo\_67
- Track 23 : Arib1\_64, Techage\_66, Kari\_63, Fishburne\_64, Langerak\_65, Etoile\_63, Donovan\_65
- Track 24 : FirstPlacePfu\_69, Bunnies\_71, Ksquared\_69
- Track 25 : Camster\_66, Necropolis\_63, Dynamo\_65, Bogie\_68, Shipwreck\_68, HUHilltop\_68
- Track 26 : Bartholomew\_61, Venti\_63
- Track 27 : Zilizebeth\_71
- Track 28 : Sonah\_66
- Track 29 : Pygmy\_69
- Track 30 : Tortellini\_71
- Track 31 : Xavia\_67
- Track 32 : BigNuz\_67
- Track 33 : Nazo\_68

- Track 34 : Phayonce\_69
- Track 35 : ThulaThula\_73
- Track 36 : Purky\_78
- Track 37 : IdentityCrisis\_57
- Track 38 : Gudmit\_65
- Track 39 : LilSpotty\_82
- Track 40 : Eyre\_61
- Track 41 : P3MA\_56

**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 59 of the 67 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aloeri\_90, Arib1\_64, Atcoo\_67, Awesomesauce\_87, Babsiella\_67, Bartholomew\_61, Bhagsy\_70, BigNuz\_67, Bogie\_68, Brusacoram\_67, Bunnies\_71, CactusJack\_66, Camster\_66, Che9c\_75, ChickenDinner\_90, DocMcStuffins\_84, Donovan\_65, Dynamo\_65, Etoile\_63, FirstPlacePfu\_69, Fishburne\_64, Gavriela\_65, Glaske\_65, GreaseLightnin\_70, HC\_62, HUHilltop\_68, Island3\_67, Jebeks\_66, Jung\_66, Juniormint\_63, Kari\_63, KilKor\_66, Ksquared\_69, Langerak\_65, LilSpotty\_82, Majeke\_68, Malithi\_65, Mangethe\_68, Megidido\_65, Misha28\_86, Nazo\_68, Necropolis\_63, Phalm\_66, Phayonce\_69, Phegasus\_68, Phineas\_66, Piper2020\_91, Polkaroo\_67, Purky\_78, Pygmy\_69, QueenHazel\_61, Sbash\_79, Shipwreck\_68, Sonah\_66, StevieRay\_70, StressBall\_65, Stuck\_77, Techage\_66, Thespiis\_67, ThulaThula\_73, TootsiePop\_86, Tortellini\_71, Venti\_63, Vidya\_64, Willsammy\_67, Xavia\_67, Xula\_61, Zilizebeth\_71,

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

- Brujita\_66,

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

- Aminay\_74, Eyre\_61, Gudmit\_65, IdentityCrisis\_57, Maruru\_82, Mufasa8\_85, P3MA\_56, Sonali\_80, Sunshine23\_82,

**Summary by start number:**

Start 19:

- Found in 1 of 78 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aminay\_74 (K7),

Start 20:

- Found in 1 of 78 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gudmit\_65 (singleton),

Start 21:

- Found in 1 of 78 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Eyre\_61 (singleton),

#### Start 23:

- Found in 69 of 78 ( 88.5% ) of genes in pham
- Manual Annotations of this start: 59 of 67
- Called 98.6% of time when present
- Phage (with cluster) where this start called: Aloeri\_90 (F1), Arib1\_64 (P1), Atcoo\_67 (P1), Awesomesauce\_87 (F1), Babsiella\_67 (I1), Bartholomew\_61 (P1), Bhagsy\_70 (P1), BigNuz\_67 (P4), Bogie\_68 (P1), Brusacoram\_67 (P1), Bunnies\_71 (P1), CactusJack\_66 (P1), Camster\_66 (P1), Che9c\_75 (I2), ChickenDinner\_90 (F1), DocMcStuffins\_84 (F1), Donovan\_65 (P1), Dynamo\_65 (P1), Etoile\_63 (P1), FirstPlacePfu\_69 (P1), Fishburne\_64 (P1), Gavriela\_65 (P1), Glaske\_65 (P1), GreaseLightnin\_70 (P1), HC\_62 (I1), HUHilltop\_68 (P1), Island3\_67 (I1), Jebeks\_66 (P1), Jung\_66 (P1), Juniormint\_63 (P1), Kari\_63 (P1), KilKor\_66 (P1), Ksquared\_69 (P1), Langerak\_65 (P1), LilSpotty\_82 (singleton), Majeke\_68 (P1), Malithi\_65 (P1), Mangethe\_68 (P1), Megiddo\_65 (P1), Misha28\_86 (F1), Nazo\_68 (P4), Necropolis\_63 (P1), Phalm\_66 (P1), Phayonce\_69 (P5), Phegasus\_68 (P1), Phineas\_66 (P1), Piper2020\_91 (F1), Polkaroo\_67 (P1), Purky\_78 (P6), Pygmy\_69 (P1), QueenHazel\_61 (I1), Sbash\_79 (I2), Shipwreck\_68 (P1), Sonah\_66 (P1), StevieRay\_70 (P1), StressBall\_65 (P1), Stuck\_77 (I2), Techage\_66 (P1), Thespis\_67 (P1), ThulaThula\_73 (P5), TootsiePop\_86 (F1), Tortellini\_71 (P2), Venti\_63 (P1), Vidya\_64 (P1), Willsammy\_67 (P1), Xavia\_67 (P3), Xula\_61 (I1), Zilizebeth\_71 (P1),

#### Start 24:

- Found in 3 of 78 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Brujita\_66 (I1),

#### Start 28:

- Found in 1 of 78 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Mufasa8\_85 (FG),

#### Start 31:

- Found in 3 of 78 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Maruru\_82 (FG), Sonali\_80 (FG), Sunshine23\_82 (FG),

#### Start 33:

- Found in 1 of 78 ( 1.3% ) of genes in pham
- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: P3MA\_56 (singleton),

#### Start 34:

- Found in 1 of 78 ( 1.3% ) of genes in pham

- Manual Annotations of this start: 1 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: IdentityCrisis\_57 (singleton),

### **Summary by clusters:**

There are 12 clusters represented in this pham: P2, F1, singleton, P1, P6, P4, P5, I1, P3, I2, K7, FG,

Info for manual annotations of cluster F1:

- Start number 23 was manually annotated 5 times for cluster F1.

Info for manual annotations of cluster FG:

- Start number 28 was manually annotated 1 time for cluster FG.
- Start number 31 was manually annotated 1 time for cluster FG.

Info for manual annotations of cluster I1:

- Start number 23 was manually annotated 5 times for cluster I1.
- Start number 24 was manually annotated 1 time for cluster I1.

Info for manual annotations of cluster I2:

- Start number 23 was manually annotated 2 times for cluster I2.

Info for manual annotations of cluster K7:

- Start number 19 was manually annotated 1 time for cluster K7.

Info for manual annotations of cluster P1:

- Start number 23 was manually annotated 39 times for cluster P1.

Info for manual annotations of cluster P2:

- Start number 23 was manually annotated 1 time for cluster P2.

Info for manual annotations of cluster P3:

- Start number 23 was manually annotated 1 time for cluster P3.

Info for manual annotations of cluster P4:

- Start number 23 was manually annotated 2 times for cluster P4.

Info for manual annotations of cluster P5:

- Start number 23 was manually annotated 2 times for cluster P5.

Info for manual annotations of cluster P6:

- Start number 23 was manually annotated 1 time for cluster P6.

### **Gene Information:**

Gene: Aloeri\_90 Start: 51883, Stop: 52788, Start Num: 23

Candidate Starts for Aloeri\_90:

(Start: 23 @51883 has 59 MA's), (32, 51961), (64, 52246), (71, 52297), (73, 52345), (75, 52375), (85, 52489), (88, 52555), (110, 52693), (111, 52699), (114, 52723), (119, 52747), (122, 52756),

Gene: Aminay\_74 Start: 48045, Stop: 48938, Start Num: 19

Candidate Starts for Aminay\_74:

(18, 48039), (Start: 19 @48045 has 1 MA's), (22, 48060), (25, 48102), (26, 48105), (32, 48141), (37, 48189), (39, 48219), (45, 48261), (58, 48372), (63, 48408), (64, 48411), (67, 48435), (69, 48438), (76, 48540), (78, 48582), (81, 48606), (83, 48615), (89, 48711), (95, 48759), (100, 48789), (105, 48816), (107, 48834), (108, 48843), (109, 48846), (124, 48927),

Gene: Arib1\_64 Start: 41089, Stop: 41991, Start Num: 23

Candidate Starts for Arib1\_64:

(4, 40597), (7, 40885), (14, 41014), (17, 41059), (Start: 23 @41089 has 59 MA's), (26, 41131), (57, 41410), (58, 41413), (71, 41503), (85, 41695), (86, 41728), (92, 41782), (97, 41824), (106, 41875), (111, 41905), (118, 41944), (119, 41953),

Gene: Atcoo\_67 Start: 44457, Stop: 45359, Start Num: 23

Candidate Starts for Atcoo\_67:

(2, 43938), (7, 44253), (14, 44382), (17, 44427), (Start: 23 @44457 has 59 MA's), (26, 44499), (38, 44589), (57, 44778), (58, 44781), (71, 44871), (85, 45063), (97, 45192), (111, 45273), (119, 45321),

Gene: Awesomesauce\_87 Start: 52119, Stop: 53024, Start Num: 23

Candidate Starts for Awesomesauce\_87:

(Start: 23 @52119 has 59 MA's), (32, 52197), (64, 52482), (71, 52533), (73, 52581), (75, 52611), (85, 52725), (88, 52791), (110, 52929), (111, 52935), (114, 52959), (119, 52983), (122, 52992),

Gene: Babsiella\_67 Start: 42425, Stop: 43327, Start Num: 23

Candidate Starts for Babsiella\_67:

(Start: 23 @42425 has 59 MA's), (57, 42746), (64, 42788), (71, 42839), (85, 43031), (86, 43064), (92, 43118), (97, 43160), (102, 43190), (111, 43241), (119, 43289),

Gene: Bartholomew\_61 Start: 40452, Stop: 41354, Start Num: 23

Candidate Starts for Bartholomew\_61:

(Start: 23 @40452 has 59 MA's), (57, 40773), (64, 40815), (71, 40866), (85, 41058), (86, 41091), (92, 41145), (97, 41187), (106, 41238), (111, 41268), (118, 41307), (119, 41316),

Gene: Bhagsy\_70 Start: 43574, Stop: 44476, Start Num: 23

Candidate Starts for Bhagsy\_70:

(2, 43055), (7, 43370), (14, 43499), (17, 43544), (Start: 23 @43574 has 59 MA's), (26, 43616), (38, 43706), (57, 43895), (58, 43898), (71, 43988), (85, 44180), (97, 44309), (111, 44390), (119, 44438),

Gene: BigNuz\_67 Start: 43296, Stop: 44198, Start Num: 23

Candidate Starts for BigNuz\_67:

(Start: 23 @43296 has 59 MA's), (26, 43338), (29, 43362), (48, 43551), (50, 43560), (53, 43569), (57, 43617), (58, 43620), (71, 43710), (76, 43791), (79, 43836), (85, 43902), (86, 43935), (106, 44082), (111, 44112),

Gene: Bogie\_68 Start: 43439, Stop: 44341, Start Num: 23

Candidate Starts for Bogie\_68:

(2, 42920), (7, 43235), (14, 43364), (17, 43409), (Start: 23 @43439 has 59 MA's), (26, 43481), (38, 43571), (50, 43703), (57, 43760), (58, 43763), (71, 43853), (85, 44045), (97, 44174), (106, 44225), (111, 44255), (118, 44294), (119, 44303),

Gene: Brujita\_66 Start: 42486, Stop: 43373, Start Num: 24

Candidate Starts for Brujita\_66:

(Start: 23 @42471 has 59 MA's), (Start: 24 @42486 has 1 MA's), (35, 42558), (50, 42735), (57, 42792), (58, 42795), (60, 42801), (64, 42834), (73, 42933), (75, 42963), (86, 43110), (102, 43236), (111, 43287), (119, 43335),

Gene: Brusacoram\_67 Start: 43000, Stop: 43902, Start Num: 23

Candidate Starts for Brusacoram\_67:

(2, 42481), (7, 42796), (14, 42925), (17, 42970), (Start: 23 @43000 has 59 MA's), (26, 43042), (57, 43321), (58, 43324), (71, 43414), (85, 43606), (97, 43735), (111, 43816), (119, 43864),

Gene: Bunnies\_71 Start: 44201, Stop: 45103, Start Num: 23

Candidate Starts for Bunnies\_71:

(2, 43682), (7, 43997), (14, 44126), (17, 44171), (Start: 23 @44201 has 59 MA's), (26, 44243), (38, 44333), (57, 44522), (58, 44525), (71, 44615), (85, 44807), (86, 44840), (97, 44936), (111, 45017), (119, 45065),

Gene: CactusJack\_66 Start: 43072, Stop: 43974, Start Num: 23

Candidate Starts for CactusJack\_66:

(2, 42553), (7, 42868), (14, 42997), (17, 43042), (Start: 23 @43072 has 59 MA's), (26, 43114), (57, 43393), (58, 43396), (71, 43486), (85, 43678), (86, 43711), (92, 43765), (97, 43807), (106, 43858), (111, 43888), (118, 43927), (119, 43936),

Gene: Camster\_66 Start: 41900, Stop: 42802, Start Num: 23

Candidate Starts for Camster\_66:

(2, 41381), (7, 41696), (14, 41825), (17, 41870), (Start: 23 @41900 has 59 MA's), (26, 41942), (38, 42032), (50, 42164), (57, 42221), (58, 42224), (71, 42314), (85, 42506), (97, 42635), (106, 42686), (111, 42716), (118, 42755), (119, 42764),

Gene: Che9c\_75 Start: 52152, Stop: 53057, Start Num: 23

Candidate Starts for Che9c\_75:

(7, 51948), (Start: 23 @52152 has 59 MA's), (32, 52230), (57, 52473), (64, 52515), (71, 52566), (73, 52614), (75, 52644), (79, 52692), (84, 52734), (87, 52794), (102, 52917), (111, 52968), (114, 52992), (119, 53016), (122, 53025),

Gene: ChickenDinner\_90 Start: 51883, Stop: 52788, Start Num: 23

Candidate Starts for ChickenDinner\_90:

(Start: 23 @51883 has 59 MA's), (32, 51961), (64, 52246), (71, 52297), (73, 52345), (75, 52375), (85, 52489), (88, 52555), (110, 52693), (111, 52699), (114, 52723), (119, 52747), (122, 52756),

Gene: DocMcStuffins\_84 Start: 53513, Stop: 54418, Start Num: 23

Candidate Starts for DocMcStuffins\_84:

(Start: 23 @53513 has 59 MA's), (32, 53591), (64, 53876), (71, 53927), (73, 53975), (75, 54005), (85, 54119), (88, 54185), (110, 54323), (111, 54329), (114, 54353), (119, 54377), (122, 54386),

Gene: Donovan\_65 Start: 42034, Stop: 42936, Start Num: 23

Candidate Starts for Donovan\_65:

(4, 41542), (7, 41830), (14, 41959), (17, 42004), (Start: 23 @42034 has 59 MA's), (26, 42076), (57, 42355), (58, 42358), (71, 42448), (85, 42640), (86, 42673), (92, 42727), (97, 42769), (106, 42820), (111, 42850), (118, 42889), (119, 42898),

Gene: Dynamo\_65 Start: 41473, Stop: 42375, Start Num: 23

Candidate Starts for Dynamo\_65:

(2, 40954), (7, 41269), (14, 41398), (17, 41443), (Start: 23 @41473 has 59 MA's), (26, 41515), (38, 41605), (50, 41737), (57, 41794), (58, 41797), (71, 41887), (85, 42079), (97, 42208), (106, 42259),

(111, 42289), (118, 42328), (119, 42337),

Gene: Etoile\_63 Start: 41860, Stop: 42762, Start Num: 23

Candidate Starts for Etoile\_63:

(4, 41368), (7, 41656), (14, 41785), (17, 41830), (Start: 23 @41860 has 59 MA's), (26, 41902), (57, 42181), (58, 42184), (71, 42274), (85, 42466), (86, 42499), (92, 42553), (97, 42595), (106, 42646), (111, 42676), (118, 42715), (119, 42724),

Gene: Eyre\_61 Start: 39340, Stop: 40278, Start Num: 21

Candidate Starts for Eyre\_61:

(Start: 21 @39340 has 1 MA's), (45, 39550), (47, 39589), (48, 39598), (54, 39622), (55, 39652), (62, 39703), (77, 39862), (82, 39910), (91, 40030), (117, 40198), (121, 40219), (124, 40237), (125, 40246), (126, 40267),

Gene: FirstPlacePfu\_69 Start: 41066, Stop: 41968, Start Num: 23

Candidate Starts for FirstPlacePfu\_69:

(2, 40547), (7, 40862), (14, 40991), (17, 41036), (Start: 23 @41066 has 59 MA's), (26, 41108), (38, 41198), (57, 41387), (58, 41390), (71, 41480), (85, 41672), (86, 41705), (97, 41801), (111, 41882), (119, 41930),

Gene: Fishburne\_64 Start: 41860, Stop: 42762, Start Num: 23

Candidate Starts for Fishburne\_64:

(4, 41368), (7, 41656), (14, 41785), (17, 41830), (Start: 23 @41860 has 59 MA's), (26, 41902), (57, 42181), (58, 42184), (71, 42274), (85, 42466), (86, 42499), (92, 42553), (97, 42595), (106, 42646), (111, 42676), (118, 42715), (119, 42724),

Gene: Gavriela\_65 Start: 42765, Stop: 43667, Start Num: 23

Candidate Starts for Gavriela\_65:

(2, 42246), (7, 42561), (14, 42690), (17, 42735), (Start: 23 @42765 has 59 MA's), (26, 42807), (57, 43086), (58, 43089), (71, 43179), (85, 43371), (86, 43404), (92, 43458), (97, 43500), (106, 43551), (111, 43581), (118, 43620), (119, 43629),

Gene: Glaske\_65 Start: 43072, Stop: 43974, Start Num: 23

Candidate Starts for Glaske\_65:

(2, 42553), (7, 42868), (14, 42997), (17, 43042), (Start: 23 @43072 has 59 MA's), (26, 43114), (57, 43393), (58, 43396), (71, 43486), (85, 43678), (86, 43711), (92, 43765), (97, 43807), (106, 43858), (111, 43888), (118, 43927), (119, 43936),

Gene: GreaseLightnin\_70 Start: 43854, Stop: 44756, Start Num: 23

Candidate Starts for GreaseLightnin\_70:

(2, 43335), (7, 43650), (14, 43779), (17, 43824), (Start: 23 @43854 has 59 MA's), (26, 43896), (38, 43986), (57, 44175), (58, 44178), (71, 44268), (85, 44460), (97, 44589), (111, 44670), (119, 44718),

Gene: Gudmit\_65 Start: 38909, Stop: 39847, Start Num: 20

Candidate Starts for Gudmit\_65:

(8, 38729), (16, 38858), (Start: 20 @38909 has 1 MA's), (30, 38990), (42, 39113), (45, 39125), (48, 39173), (51, 39188), (59, 39245), (72, 39347), (90, 39596), (98, 39659), (99, 39662), (117, 39770), (121, 39791), (124, 39809), (125, 39818),

Gene: HC\_62 Start: 39977, Stop: 40879, Start Num: 23

Candidate Starts for HC\_62:

(Start: 23 @39977 has 59 MA's), (57, 40298), (64, 40340), (71, 40391), (85, 40583), (86, 40616), (97, 40712), (102, 40742), (111, 40793), (119, 40841),



Gene: HUHilltop\_68 Start: 41696, Stop: 42598, Start Num: 23

Candidate Starts for HUHilltop\_68:

(2, 41177), (7, 41492), (14, 41621), (17, 41666), (Start: 23 @41696 has 59 MA's), (26, 41738), (38, 41828), (50, 41960), (57, 42017), (58, 42020), (71, 42110), (85, 42302), (97, 42431), (106, 42482), (111, 42512), (118, 42551), (119, 42560),

Gene: IdentityCrisis\_57 Start: 35089, Stop: 35964, Start Num: 34

Candidate Starts for IdentityCrisis\_57:

(27, 35053), (Start: 34 @35089 has 1 MA's), (40, 35170), (52, 35284), (60, 35341), (66, 35395), (93, 35725), (94, 35731), (115, 35851),

Gene: Island3\_67 Start: 42444, Stop: 43346, Start Num: 23

Candidate Starts for Island3\_67:

(7, 42237), (14, 42366), (17, 42414), (Start: 23 @42444 has 59 MA's), (26, 42486), (38, 42576), (50, 42708), (57, 42765), (58, 42768), (60, 42774), (64, 42807), (73, 42906), (75, 42936), (86, 43083), (102, 43209), (111, 43260), (119, 43308),

Gene: Jebeks\_66 Start: 40993, Stop: 41895, Start Num: 23

Candidate Starts for Jebeks\_66:

(2, 40474), (7, 40789), (14, 40918), (17, 40963), (Start: 23 @40993 has 59 MA's), (26, 41035), (57, 41314), (58, 41317), (71, 41407), (85, 41599), (86, 41632), (92, 41686), (97, 41728), (106, 41779), (111, 41809), (118, 41848), (119, 41857),

Gene: Jung\_66 Start: 41978, Stop: 42880, Start Num: 23

Candidate Starts for Jung\_66:

(Start: 23 @41978 has 59 MA's), (35, 42065), (38, 42110), (50, 42242), (57, 42299), (58, 42302), (71, 42392), (85, 42584), (97, 42713), (111, 42794), (119, 42842),

Gene: Juniormint\_63 Start: 40449, Stop: 41351, Start Num: 23

Candidate Starts for Juniormint\_63:

(2, 39930), (7, 40245), (14, 40374), (17, 40419), (Start: 23 @40449 has 59 MA's), (26, 40491), (57, 40770), (58, 40773), (71, 40863), (85, 41055), (86, 41088), (92, 41142), (97, 41184), (106, 41235), (111, 41265), (118, 41304), (119, 41313),

Gene: Kari\_63 Start: 41857, Stop: 42759, Start Num: 23

Candidate Starts for Kari\_63:

(4, 41365), (7, 41653), (14, 41782), (17, 41827), (Start: 23 @41857 has 59 MA's), (26, 41899), (57, 42178), (58, 42181), (71, 42271), (85, 42463), (86, 42496), (92, 42550), (97, 42592), (106, 42643), (111, 42673), (118, 42712), (119, 42721),

Gene: KilKor\_66 Start: 43765, Stop: 44667, Start Num: 23

Candidate Starts for KilKor\_66:

(2, 43246), (7, 43561), (14, 43690), (17, 43735), (Start: 23 @43765 has 59 MA's), (26, 43807), (57, 44086), (58, 44089), (71, 44179), (85, 44371), (86, 44404), (92, 44458), (97, 44500), (106, 44551), (111, 44581), (118, 44620), (119, 44629),

Gene: Ksquared\_69 Start: 44078, Stop: 44980, Start Num: 23

Candidate Starts for Ksquared\_69:

(2, 43559), (7, 43874), (14, 44003), (17, 44048), (Start: 23 @44078 has 59 MA's), (26, 44120), (38, 44210), (57, 44399), (58, 44402), (71, 44492), (85, 44684), (86, 44717), (97, 44813), (111, 44894), (119, 44942),

Gene: Langerak\_65 Start: 41837, Stop: 42739, Start Num: 23

Candidate Starts for Langerak\_65:

(4, 41345), (7, 41633), (14, 41762), (17, 41807), (Start: 23 @41837 has 59 MA's), (26, 41879), (57, 42158), (58, 42161), (71, 42251), (85, 42443), (86, 42476), (92, 42530), (97, 42572), (106, 42623), (111, 42653), (118, 42692), (119, 42701),

Gene: LilSpotty\_82 Start: 47559, Stop: 48464, Start Num: 23

Candidate Starts for LilSpotty\_82:

(Start: 23 @47559 has 59 MA's), (32, 47637), (57, 47880), (60, 47889), (64, 47922), (71, 47973), (73, 48021), (75, 48051), (85, 48165), (86, 48198), (88, 48231), (110, 48369), (111, 48375), (114, 48399), (119, 48423), (122, 48432),

Gene: Majeke\_68 Start: 42487, Stop: 43389, Start Num: 23

Candidate Starts for Majeke\_68:

(4, 41992), (7, 42283), (14, 42412), (17, 42457), (Start: 23 @42487 has 59 MA's), (26, 42529), (57, 42808), (58, 42811), (71, 42901), (85, 43093), (86, 43126), (92, 43180), (97, 43222), (106, 43273), (111, 43303), (118, 43342), (119, 43351),

Gene: Malithi\_65 Start: 41622, Stop: 42524, Start Num: 23

Candidate Starts for Malithi\_65:

(13, 41544), (Start: 23 @41622 has 59 MA's), (26, 41664), (38, 41754), (50, 41886), (57, 41943), (58, 41946), (71, 42036), (85, 42228), (97, 42357), (106, 42408), (111, 42438), (118, 42477), (119, 42486),

Gene: Mangethe\_68 Start: 42487, Stop: 43389, Start Num: 23

Candidate Starts for Mangethe\_68:

(4, 41992), (7, 42283), (14, 42412), (17, 42457), (Start: 23 @42487 has 59 MA's), (26, 42529), (57, 42808), (58, 42811), (71, 42901), (85, 43093), (86, 43126), (92, 43180), (97, 43222), (106, 43273), (111, 43303), (118, 43342), (119, 43351),

Gene: Maruru\_82 Start: 50216, Stop: 51058, Start Num: 31

Candidate Starts for Maruru\_82:

(Start: 31 @50216 has 1 MA's), (41, 50321), (43, 50339), (49, 50402), (56, 50456), (60, 50471), (61, 50480), (64, 50507), (65, 50510), (81, 50684), (120, 50987), (123, 50996),

Gene: Megiddo\_65 Start: 43633, Stop: 44535, Start Num: 23

Candidate Starts for Megiddo\_65:

(2, 43114), (7, 43429), (14, 43558), (17, 43603), (Start: 23 @43633 has 59 MA's), (26, 43675), (57, 43954), (58, 43957), (71, 44047), (85, 44239), (86, 44272), (92, 44326), (97, 44368), (106, 44419), (111, 44449), (118, 44488), (119, 44497),

Gene: Misha28\_86 Start: 52818, Stop: 53723, Start Num: 23

Candidate Starts for Misha28\_86:

(Start: 23 @52818 has 59 MA's), (32, 52896), (64, 53181), (71, 53232), (73, 53280), (75, 53310), (85, 53424), (88, 53490), (110, 53628), (111, 53634), (114, 53658), (119, 53682), (122, 53691),

Gene: Mufasa8\_85 Start: 50444, Stop: 51298, Start Num: 28

Candidate Starts for Mufasa8\_85:

(Start: 28 @50444 has 1 MA's), (44, 50588), (46, 50633), (49, 50642), (56, 50696), (74, 50852), (79, 50897), (80, 50903), (96, 51086), (101, 51119), (104, 51128), (112, 51179), (116, 51203), (120, 51224), (123, 51233),

Gene: Nazo\_68 Start: 43481, Stop: 44383, Start Num: 23

Candidate Starts for Nazo\_68:

(Start: 23 @43481 has 59 MA's), (26, 43523), (53, 43754), (58, 43805), (71, 43895), (73, 43943), (79, 44021), (85, 44087), (106, 44267), (111, 44297),

Gene: Necropolis\_63 Start: 41062, Stop: 41964, Start Num: 23

Candidate Starts for Necropolis\_63:

(2, 40543), (7, 40858), (14, 40987), (17, 41032), (Start: 23 @41062 has 59 MA's), (26, 41104), (38, 41194), (50, 41326), (57, 41383), (58, 41386), (71, 41476), (85, 41668), (97, 41797), (106, 41848), (111, 41878), (118, 41917), (119, 41926),

Gene: P3MA\_56 Start: 37816, Stop: 38691, Start Num: 33

Candidate Starts for P3MA\_56:

(Start: 33 @37816 has 1 MA's), (40, 37900), (52, 38014), (56, 38056), (66, 38125), (68, 38137), (93, 38455), (103, 38503), (113, 38563), (118, 38593),

Gene: Phalm\_66 Start: 43063, Stop: 43965, Start Num: 23

Candidate Starts for Phalm\_66:

(2, 42544), (7, 42859), (14, 42988), (17, 43033), (Start: 23 @43063 has 59 MA's), (26, 43105), (57, 43384), (58, 43387), (71, 43477), (85, 43669), (86, 43702), (92, 43756), (97, 43798), (106, 43849), (111, 43879), (118, 43918), (119, 43927),

Gene: Phayonce\_69 Start: 45605, Stop: 46513, Start Num: 23

Candidate Starts for Phayonce\_69:

(1, 45062), (3, 45080), (6, 45269), (7, 45386), (14, 45518), (17, 45575), (Start: 23 @45605 has 59 MA's), (Start: 24 @45620 has 1 MA's), (32, 45683), (38, 45737), (57, 45926), (58, 45929), (60, 45935), (70, 46007), (79, 46145), (85, 46211), (86, 46244), (106, 46391), (111, 46421), (118, 46460),

Gene: Phegasus\_68 Start: 42454, Stop: 43356, Start Num: 23

Candidate Starts for Phegasus\_68:

(4, 41959), (7, 42250), (14, 42379), (17, 42424), (Start: 23 @42454 has 59 MA's), (26, 42496), (57, 42775), (58, 42778), (71, 42868), (85, 43060), (86, 43093), (92, 43147), (97, 43189), (106, 43240), (111, 43270), (118, 43309), (119, 43318),

Gene: Phineas\_66 Start: 42030, Stop: 42932, Start Num: 23

Candidate Starts for Phineas\_66:

(13, 41952), (Start: 23 @42030 has 59 MA's), (26, 42072), (38, 42162), (50, 42294), (57, 42351), (58, 42354), (71, 42444), (85, 42636), (97, 42765), (106, 42816), (111, 42846), (118, 42885), (119, 42894),

Gene: Piper2020\_91 Start: 53066, Stop: 53971, Start Num: 23

Candidate Starts for Piper2020\_91:

(Start: 23 @53066 has 59 MA's), (32, 53144), (64, 53429), (71, 53480), (73, 53528), (75, 53558), (85, 53672), (88, 53738), (110, 53876), (111, 53882), (114, 53906), (119, 53930), (122, 53939),

Gene: Polkaroo\_67 Start: 43777, Stop: 44679, Start Num: 23

Candidate Starts for Polkaroo\_67:

(2, 43258), (7, 43573), (14, 43702), (17, 43747), (Start: 23 @43777 has 59 MA's), (26, 43819), (38, 43909), (57, 44098), (58, 44101), (71, 44191), (85, 44383), (86, 44416), (92, 44470), (97, 44512), (106, 44563), (111, 44593), (118, 44632), (119, 44641),

Gene: Purky\_78 Start: 47557, Stop: 48462, Start Num: 23

Candidate Starts for Purky\_78:

(Start: 23 @47557 has 59 MA's), (32, 47635), (53, 47830), (64, 47920), (73, 48019), (85, 48163), (87, 48199), (102, 48322), (111, 48373), (114, 48397), (119, 48421), (122, 48430),

Gene: Pygmy\_69 Start: 43495, Stop: 44397, Start Num: 23

Candidate Starts for Pygmy\_69:

(2, 42976), (7, 43291), (14, 43420), (17, 43465), (Start: 23 @43495 has 59 MA's), (26, 43537), (38, 43627), (50, 43759), (57, 43816), (58, 43819), (71, 43909), (85, 44101), (86, 44134), (92, 44188), (97, 44230), (106, 44281), (111, 44311), (118, 44350), (119, 44359),

Gene: QueenHazel\_61 Start: 41353, Stop: 42255, Start Num: 23

Candidate Starts for QueenHazel\_61:

(9, 41236), (11, 41254), (Start: 23 @41353 has 59 MA's), (57, 41674), (64, 41716), (71, 41767), (85, 41959), (86, 41992), (92, 42046), (97, 42088), (111, 42169), (118, 42208), (119, 42217),

Gene: Sbash\_79 Start: 50602, Stop: 51504, Start Num: 23

Candidate Starts for Sbash\_79:

(10, 50491), (12, 50509), (Start: 23 @50602 has 59 MA's), (29, 50668), (32, 50680), (36, 50725), (38, 50734), (60, 50932), (64, 50965), (71, 51016), (73, 51064), (75, 51094), (85, 51208), (87, 51244), (102, 51367), (106, 51388), (111, 51418), (114, 51442),

Gene: Shipwreck\_68 Start: 43470, Stop: 44372, Start Num: 23

Candidate Starts for Shipwreck\_68:

(2, 42951), (7, 43266), (14, 43395), (17, 43440), (Start: 23 @43470 has 59 MA's), (26, 43512), (38, 43602), (50, 43734), (57, 43791), (58, 43794), (71, 43884), (85, 44076), (97, 44205), (106, 44256), (111, 44286), (118, 44325), (119, 44334),

Gene: Sonah\_66 Start: 41167, Stop: 42069, Start Num: 23

Candidate Starts for Sonah\_66:

(2, 40648), (7, 40963), (14, 41092), (17, 41137), (Start: 23 @41167 has 59 MA's), (26, 41209), (50, 41431), (57, 41488), (58, 41491), (71, 41581), (85, 41773), (97, 41902), (106, 41953), (111, 41983), (118, 42022), (119, 42031),

Gene: Sonali\_80 Start: 50220, Stop: 51053, Start Num: 31

Candidate Starts for Sonali\_80:

(Start: 31 @50220 has 1 MA's), (41, 50325), (43, 50343), (49, 50406), (56, 50460), (61, 50484), (64, 50511), (65, 50514), (81, 50688), (123, 51000),

Gene: StevieRay\_70 Start: 44234, Stop: 45136, Start Num: 23

Candidate Starts for StevieRay\_70:

(2, 43715), (7, 44030), (14, 44159), (17, 44204), (Start: 23 @44234 has 59 MA's), (26, 44276), (38, 44366), (57, 44555), (58, 44558), (71, 44648), (85, 44840), (97, 44969), (111, 45050), (119, 45098),

Gene: StressBall\_65 Start: 42765, Stop: 43667, Start Num: 23

Candidate Starts for StressBall\_65:

(2, 42246), (7, 42561), (14, 42690), (17, 42735), (Start: 23 @42765 has 59 MA's), (26, 42807), (57, 43086), (58, 43089), (71, 43179), (85, 43371), (86, 43404), (92, 43458), (97, 43500), (106, 43551), (111, 43581), (118, 43620), (119, 43629),

Gene: Stuck\_77 Start: 49856, Stop: 50758, Start Num: 23

Candidate Starts for Stuck\_77:

(Start: 23 @49856 has 59 MA's), (32, 49934), (57, 50177), (64, 50219), (71, 50270), (73, 50318), (79, 50396), (87, 50498), (102, 50621), (106, 50642), (111, 50672), (114, 50696),

Gene: Sunshine23\_82 Start: 50194, Stop: 51027, Start Num: 31

Candidate Starts for Sunshine23\_82:

(15, 50056), (Start: 31 @50194 has 1 MA's), (41, 50299), (43, 50317), (49, 50380), (56, 50434), (61, 50458), (64, 50485), (65, 50488), (81, 50662), (123, 50974),

Gene: Techage\_66 Start: 42044, Stop: 42946, Start Num: 23

Candidate Starts for Techage\_66:

(4, 41552), (7, 41840), (14, 41969), (17, 42014), (Start: 23 @42044 has 59 MA's), (26, 42086), (57, 42365), (58, 42368), (71, 42458), (85, 42650), (86, 42683), (92, 42737), (97, 42779), (106, 42830), (111, 42860), (118, 42899), (119, 42908),

Gene: Thespis\_67 Start: 43000, Stop: 43902, Start Num: 23

Candidate Starts for Thespis\_67:

(2, 42481), (7, 42796), (14, 42925), (17, 42970), (Start: 23 @43000 has 59 MA's), (26, 43042), (57, 43321), (58, 43324), (71, 43414), (85, 43606), (97, 43735), (111, 43816), (119, 43864),

Gene: ThulaThula\_73 Start: 47020, Stop: 47925, Start Num: 23

Candidate Starts for ThulaThula\_73:

(3, 46501), (7, 46804), (14, 46933), (17, 46990), (Start: 23 @47020 has 59 MA's), (Start: 24 @47035 has 1 MA's), (32, 47098), (38, 47152), (57, 47341), (64, 47383), (71, 47434), (73, 47482), (75, 47512), (79, 47560), (85, 47626), (87, 47662), (102, 47785), (111, 47836), (114, 47860), (119, 47884), (122, 47893),

Gene: TootsiePop\_86 Start: 52818, Stop: 53723, Start Num: 23

Candidate Starts for TootsiePop\_86:

(Start: 23 @52818 has 59 MA's), (32, 52896), (64, 53181), (71, 53232), (73, 53280), (75, 53310), (85, 53424), (88, 53490), (110, 53628), (111, 53634), (114, 53658), (119, 53682), (122, 53691),

Gene: Tortellini\_71 Start: 46722, Stop: 47627, Start Num: 23

Candidate Starts for Tortellini\_71:

(Start: 23 @46722 has 59 MA's), (32, 46800), (57, 47043), (60, 47052), (64, 47085), (71, 47136), (73, 47184), (75, 47214), (85, 47328), (86, 47361), (88, 47394), (106, 47508), (111, 47538), (114, 47562), (119, 47586), (122, 47595),

Gene: Venti\_63 Start: 40452, Stop: 41354, Start Num: 23

Candidate Starts for Venti\_63:

(Start: 23 @40452 has 59 MA's), (57, 40773), (64, 40815), (71, 40866), (85, 41058), (86, 41091), (92, 41145), (97, 41187), (106, 41238), (111, 41268), (118, 41307), (119, 41316),

Gene: Vidya\_64 Start: 41288, Stop: 42190, Start Num: 23

Candidate Starts for Vidya\_64:

(2, 40769), (7, 41084), (14, 41213), (17, 41258), (Start: 23 @41288 has 59 MA's), (26, 41330), (57, 41609), (58, 41612), (71, 41702), (85, 41894), (97, 42023), (111, 42104), (119, 42152),

Gene: Willsammy\_67 Start: 43249, Stop: 44151, Start Num: 23

Candidate Starts for Willsammy\_67:

(2, 42730), (7, 43045), (14, 43174), (17, 43219), (Start: 23 @43249 has 59 MA's), (26, 43291), (57, 43570), (58, 43573), (71, 43663), (85, 43855), (86, 43888), (92, 43942), (97, 43984), (106, 44035), (111, 44065), (118, 44104), (119, 44113),

Gene: Xavia\_67 Start: 47327, Stop: 48229, Start Num: 23

Candidate Starts for Xavia\_67:

(5, 46886), (7, 47123), (14, 47252), (17, 47297), (Start: 23 @47327 has 59 MA's), (26, 47369), (38, 47459), (50, 47591), (57, 47648), (64, 47690), (71, 47741), (73, 47789), (75, 47819), (79, 47867), (84, 47909), (87, 47969), (102, 48092), (111, 48143), (114, 48167), (119, 48191), (122, 48200),

Gene: Xula\_61 Start: 41279, Stop: 42181, Start Num: 23

Candidate Starts for Xula\_61:

(Start: 23 @41279 has 59 MA's), (57, 41600), (58, 41603), (64, 41642), (71, 41693), (85, 41885), (86, 41918), (92, 41972), (97, 42014), (102, 42044), (111, 42095), (119, 42143),

Gene: Zilizebeth\_71 Start: 42809, Stop: 43711, Start Num: 23

Candidate Starts for Zilizebeth\_71:

(7, 42605), (14, 42734), (17, 42779), (Start: 23 @42809 has 59 MA's), (26, 42851), (57, 43130), (58, 43133), (71, 43223), (85, 43415), (86, 43448), (92, 43502), (97, 43544), (106, 43595), (111, 43625), (118, 43664), (119, 43673),