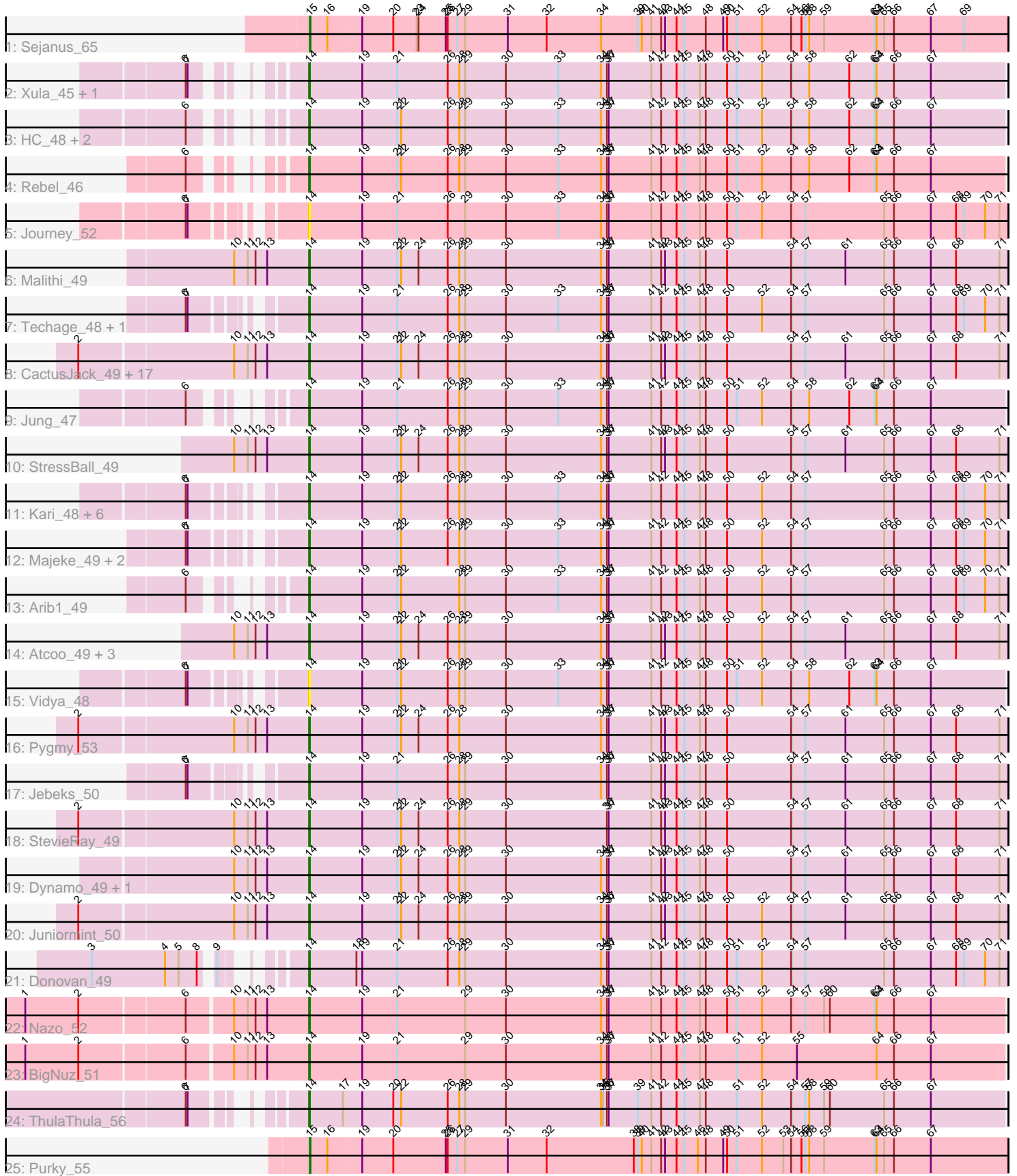


# Pham 1698



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 1698 Report

This analysis was run 05/04/24 on database version 560.

Pham number 1698 has 58 members, 4 are drafts.

Phages represented in each track:

- Track 1 : Sejanus\_65
- Track 2 : Xula\_45, QueenHazel\_46
- Track 3 : HC\_48, Shweta\_48, Babsiella\_50
- Track 4 : Rebel\_46
- Track 5 : Journey\_52
- Track 6 : Malithi\_49
- Track 7 : Techage\_48, Polkaroo\_49
- Track 8 : CactusJack\_49, Willsammy\_48, Bogie\_53, GreaseLightnin\_50, Phineas\_51, Sonah\_50, Glaske\_49, Camster\_50, Bunnies\_50, Megiddo\_49, KilKor\_49, HUHilltop\_51, Philonius\_51, Shipwreck\_53, Phalm\_49, Silvy\_49, Aggie\_49, Ksquared\_49
- Track 9 : Jung\_47
- Track 10 : StressBall\_49
- Track 11 : Kari\_48, Bartholomew\_48, FirstPlacePfu\_49, Zilizebeth\_49, Langerak\_49, Fishburne\_48, Venti\_49
- Track 12 : Majeke\_49, Phegasus\_49, Mangethe\_49
- Track 13 : Arib1\_49
- Track 14 : Atcoo\_49, Thespis\_49, Brusacoram\_49, Xeno\_51
- Track 15 : Vidya\_48
- Track 16 : Pygmy\_53
- Track 17 : Jebeks\_50
- Track 18 : StevieRay\_49
- Track 19 : Dynamo\_49, Necropolis\_48
- Track 20 : Juniormint\_50
- Track 21 : Donovan\_49
- Track 22 : Nazo\_52
- Track 23 : BigNuz\_51
- Track 24 : ThulaThula\_56
- Track 25 : Purky\_55

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

The start number called the most often in the published annotations is 14, it was called in 52 of the 54 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aggie\_49, Arib1\_49, Atcoo\_49, Babsiella\_50, Bartholomew\_48, BigNuz\_51, Bogie\_53, Brusacoram\_49, Bunnies\_50, CactusJack\_49, Camster\_50, Donovan\_49, Dynamo\_49, FirstPlacePfu\_49, Fishburne\_48, Glaske\_49, GreaseLightnin\_50, HC\_48, HUHilltop\_51, Jebeks\_50, Journey\_52, Jung\_47, Juniormint\_50, Kari\_48, KilKor\_49, Ksquared\_49, Langerak\_49, Majeke\_49, Malithi\_49, Mangethe\_49, Megiddo\_49, Nazo\_52, Necropolis\_48, Phalm\_49, Phegasus\_49, Philonius\_51, Phineas\_51, Polkaroo\_49, Pygmy\_53, QueenHazel\_46, Rebel\_46, Shipwreck\_53, Shweta\_48, Silvy\_49, Sonah\_50, StevieRay\_49, StressBall\_49, Techage\_48, Thespis\_49, ThulaThula\_56, Venti\_49, Vidya\_48, Willsammy\_48, Xeno\_51, Xula\_45, Zilizebeth\_49,

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

- 

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

- Purky\_55, Sejanus\_65,

### Summary by start number:

Start 14:

- Found in 56 of 58 ( 96.6% ) of genes in pham
- Manual Annotations of this start: 52 of 54
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aggie\_49 (N), Arib1\_49 (P1), Atcoo\_49 (P1), Babsiella\_50 (I1), Bartholomew\_48 (P1), BigNuz\_51 (P4), Bogie\_53 (P1), Brusacoram\_49 (P1), Bunnies\_50 (P1), CactusJack\_49 (P1), Camster\_50 (P1), Donovan\_49 (P1), Dynamo\_49 (P1), FirstPlacePfu\_49 (P1), Fishburne\_48 (P1), Glaske\_49 (P1), GreaseLightnin\_50 (P1), HC\_48 (I1), HUHilltop\_51 (P1), Jebeks\_50 (P1), Journey\_52 (N), Jung\_47 (P1), Juniormint\_50 (P1), Kari\_48 (P1), KilKor\_49 (P1), Ksquared\_49 (P1), Langerak\_49 (P1), Majeke\_49 (P1), Malithi\_49 (P1), Mangethe\_49 (P1), Megiddo\_49 (P1), Nazo\_52 (P4), Necropolis\_48 (P1), Phalm\_49 (P1), Phegasus\_49 (P1), Philonius\_51 (N), Phineas\_51 (P1), Polkaroo\_49 (P1), Pygmy\_53 (P1), QueenHazel\_46 (I1), Rebel\_46 (N), Shipwreck\_53 (P1), Shweta\_48 (N), Silvy\_49 (N), Sonah\_50 (P1), StevieRay\_49 (P1), StressBall\_49 (P1), Techage\_48 (P1), Thespis\_49 (P1), ThulaThula\_56 (P5), Venti\_49 (P1), Vidya\_48 (P1), Willsammy\_48 (P1), Xeno\_51 (N), Xula\_45 (I1), Zilizebeth\_49 (P1),

Start 15:

- Found in 2 of 58 ( 3.4% ) of genes in pham
- Manual Annotations of this start: 2 of 54
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Purky\_55 (P6), Sejanus\_65 (AD),

### Summary by clusters:

There are 7 clusters represented in this pham: P1, P6, AD, P4, P5, I1, N,

Info for manual annotations of cluster AD:

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

Info for manual annotations of cluster I1:

- Start number 14 was manually annotated 4 times for cluster I1.

Info for manual annotations of cluster N:

- Start number 14 was manually annotated 6 times for cluster N.

Info for manual annotations of cluster P1:

- Start number 14 was manually annotated 39 times for cluster P1.

Info for manual annotations of cluster P4:

- Start number 14 was manually annotated 2 times for cluster P4.

Info for manual annotations of cluster P5:

- Start number 14 was manually annotated 1 time for cluster P5.

Info for manual annotations of cluster P6:

- Start number 15 was manually annotated 1 time for cluster P6.

### ***Gene Information:***

Gene: Aggie\_49 Start: 33656, Stop: 34723, Start Num: 14

Candidate Starts for Aggie\_49:

(2, 33314), (10, 33542), (11, 33563), (12, 33575), (13, 33593), (Start: 14 @33656 has 52 MA's), (19, 33737), (21, 33791), (22, 33797), (24, 33824), (26, 33869), (28, 33887), (29, 33896), (30, 33959), (34, 34106), (36, 34115), (37, 34118), (41, 34181), (42, 34196), (43, 34202), (44, 34220), (45, 34232), (47, 34256), (48, 34265), (50, 34298), (54, 34394), (57, 34415), (61, 34475), (65, 34535), (66, 34550), (67, 34607), (68, 34646), (71, 34712),

Gene: Arib1\_49 Start: 33786, Stop: 34853, Start Num: 14

Candidate Starts for Arib1\_49:

(6, 33687), (Start: 14 @33786 has 52 MA's), (19, 33867), (21, 33921), (22, 33927), (28, 34017), (29, 34026), (30, 34089), (33, 34170), (34, 34236), (36, 34245), (37, 34248), (41, 34311), (42, 34326), (44, 34350), (45, 34362), (47, 34386), (48, 34395), (50, 34428), (52, 34482), (54, 34524), (57, 34545), (65, 34665), (66, 34680), (67, 34737), (68, 34776), (69, 34788), (70, 34821), (71, 34842),

Gene: Atcoo\_49 Start: 34545, Stop: 35612, Start Num: 14

Candidate Starts for Atcoo\_49:

(10, 34431), (11, 34452), (12, 34464), (13, 34482), (Start: 14 @34545 has 52 MA's), (19, 34626), (21, 34680), (22, 34686), (24, 34713), (26, 34758), (28, 34776), (29, 34785), (30, 34848), (34, 34995), (36, 35004), (37, 35007), (41, 35070), (42, 35085), (43, 35091), (44, 35109), (45, 35121), (47, 35145), (48, 35154), (50, 35187), (52, 35241), (54, 35283), (57, 35304), (61, 35364), (65, 35424), (66, 35439), (67, 35496), (68, 35535), (71, 35601),

Gene: Babsiella\_50 Start: 34639, Stop: 35703, Start Num: 14

Candidate Starts for Babsiella\_50:

(6, 34540), (Start: 14 @34639 has 52 MA's), (19, 34720), (21, 34774), (22, 34780), (26, 34852), (28, 34870), (29, 34879), (30, 34942), (33, 35023), (34, 35089), (36, 35098), (37, 35101), (41, 35164), (42, 35179), (44, 35203), (45, 35215), (47, 35239), (48, 35248), (50, 35281), (51, 35296), (52, 35335), (54, 35377), (58, 35404), (62, 35464), (63, 35503), (64, 35506), (66, 35533), (67, 35590),

Gene: Bartholomew\_48 Start: 33810, Stop: 34877, Start Num: 14

Candidate Starts for Bartholomew\_48:

(6, 33678), (7, 33681), (Start: 14 @33810 has 52 MA's), (19, 33891), (21, 33945), (22, 33951), (26, 34023), (28, 34041), (29, 34050), (30, 34113), (33, 34194), (34, 34260), (36, 34269), (37, 34272), (41, 34335), (42, 34350), (44, 34374), (45, 34386), (47, 34410), (48, 34419), (50, 34452), (52, 34506), (54, 34548), (57, 34569), (65, 34689), (66, 34704), (67, 34761), (68, 34800), (69, 34812), (70, 34845), (71, 34866),

Gene: BigNuz\_51 Start: 36038, Stop: 37099, Start Num: 14

Candidate Starts for BigNuz\_51:

(1, 35621), (2, 35702), (6, 35858), (10, 35924), (11, 35945), (12, 35957), (13, 35975), (Start: 14 @36038 has 52 MA's), (19, 36119), (21, 36173), (29, 36278), (30, 36341), (34, 36488), (36, 36497), (37, 36500), (41, 36563), (42, 36578), (44, 36602), (45, 36614), (47, 36638), (48, 36647), (51, 36695), (52, 36734), (55, 36782), (64, 36905), (66, 36932), (67, 36989),

Gene: Bogie\_53 Start: 36316, Stop: 37383, Start Num: 14

Candidate Starts for Bogie\_53:

(2, 35974), (10, 36202), (11, 36223), (12, 36235), (13, 36253), (Start: 14 @36316 has 52 MA's), (19, 36397), (21, 36451), (22, 36457), (24, 36484), (26, 36529), (28, 36547), (29, 36556), (30, 36619), (34, 36766), (36, 36775), (37, 36778), (41, 36841), (42, 36856), (43, 36862), (44, 36880), (45, 36892), (47, 36916), (48, 36925), (50, 36958), (54, 37054), (57, 37075), (61, 37135), (65, 37195), (66, 37210), (67, 37267), (68, 37306), (71, 37372),

Gene: Brusacoram\_49 Start: 34051, Stop: 35118, Start Num: 14

Candidate Starts for Brusacoram\_49:

(10, 33937), (11, 33958), (12, 33970), (13, 33988), (Start: 14 @34051 has 52 MA's), (19, 34132), (21, 34186), (22, 34192), (24, 34219), (26, 34264), (28, 34282), (29, 34291), (30, 34354), (34, 34501), (36, 34510), (37, 34513), (41, 34576), (42, 34591), (43, 34597), (44, 34615), (45, 34627), (47, 34651), (48, 34660), (50, 34693), (52, 34747), (54, 34789), (57, 34810), (61, 34870), (65, 34930), (66, 34945), (67, 35002), (68, 35041), (71, 35107),

Gene: Bunnies\_50 Start: 34065, Stop: 35132, Start Num: 14

Candidate Starts for Bunnies\_50:

(2, 33723), (10, 33951), (11, 33972), (12, 33984), (13, 34002), (Start: 14 @34065 has 52 MA's), (19, 34146), (21, 34200), (22, 34206), (24, 34233), (26, 34278), (28, 34296), (29, 34305), (30, 34368), (34, 34515), (36, 34524), (37, 34527), (41, 34590), (42, 34605), (43, 34611), (44, 34629), (45, 34641), (47, 34665), (48, 34674), (50, 34707), (54, 34803), (57, 34824), (61, 34884), (65, 34944), (66, 34959), (67, 35016), (68, 35055), (71, 35121),

Gene: CactusJack\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for CactusJack\_49:

(2, 33973), (10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67, 35266), (68, 35305), (71, 35371),

Gene: Camster\_50 Start: 34072, Stop: 35139, Start Num: 14

Candidate Starts for Camster\_50:

(2, 33730), (10, 33958), (11, 33979), (12, 33991), (13, 34009), (Start: 14 @34072 has 52 MA's), (19, 34153), (21, 34207), (22, 34213), (24, 34240), (26, 34285), (28, 34303), (29, 34312), (30, 34375), (34, 34522), (36, 34531), (37, 34534), (41, 34597), (42, 34612), (43, 34618), (44, 34636), (45, 34648), (47, 34672), (48, 34681), (50, 34714), (54, 34810), (57, 34831), (61, 34891), (65, 34951), (66, 34966), (67, 35023), (68, 35062), (71, 35128),

Gene: Donovan\_49 Start: 33944, Stop: 35011, Start Num: 14

Candidate Starts for Donovan\_49:

(3, 33701), (4, 33812), (5, 33833), (8, 33860), (9, 33872), (Start: 14 @33944 has 52 MA's), (18, 34016), (19, 34025), (21, 34079), (26, 34157), (28, 34175), (29, 34184), (30, 34247), (34, 34394), (36, 34403), (37, 34406), (41, 34469), (42, 34484), (44, 34508), (45, 34520), (47, 34544), (48, 34553), (50, 34586), (51, 34601), (52, 34640), (54, 34682), (57, 34703), (65, 34823), (66, 34838), (67, 34895), (68, 34934), (69, 34946), (70, 34979), (71, 35000),

Gene: Dynamo\_49 Start: 34350, Stop: 35417, Start Num: 14

Candidate Starts for Dynamo\_49:

(10, 34236), (11, 34257), (12, 34269), (13, 34287), (Start: 14 @34350 has 52 MA's), (19, 34431), (21, 34485), (22, 34491), (24, 34518), (26, 34563), (28, 34581), (29, 34590), (30, 34653), (34, 34800), (36, 34809), (37, 34812), (41, 34875), (42, 34890), (43, 34896), (44, 34914), (45, 34926), (47, 34950), (48, 34959), (50, 34992), (54, 35088), (57, 35109), (61, 35169), (65, 35229), (66, 35244), (67, 35301), (68, 35340), (71, 35406),

Gene: FirstPlacePfu\_49 Start: 33842, Stop: 34909, Start Num: 14

Candidate Starts for FirstPlacePfu\_49:

(6, 33710), (7, 33713), (Start: 14 @33842 has 52 MA's), (19, 33923), (21, 33977), (22, 33983), (26, 34055), (28, 34073), (29, 34082), (30, 34145), (33, 34226), (34, 34292), (36, 34301), (37, 34304), (41, 34367), (42, 34382), (44, 34406), (45, 34418), (47, 34442), (48, 34451), (50, 34484), (52, 34538), (54, 34580), (57, 34601), (65, 34721), (66, 34736), (67, 34793), (68, 34832), (69, 34844), (70, 34877), (71, 34898),

Gene: Fishburne\_48 Start: 33810, Stop: 34877, Start Num: 14

Candidate Starts for Fishburne\_48:

(6, 33678), (7, 33681), (Start: 14 @33810 has 52 MA's), (19, 33891), (21, 33945), (22, 33951), (26, 34023), (28, 34041), (29, 34050), (30, 34113), (33, 34194), (34, 34260), (36, 34269), (37, 34272), (41, 34335), (42, 34350), (44, 34374), (45, 34386), (47, 34410), (48, 34419), (50, 34452), (52, 34506), (54, 34548), (57, 34569), (65, 34689), (66, 34704), (67, 34761), (68, 34800), (69, 34812), (70, 34845), (71, 34866),

Gene: Glaske\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for Glaske\_49:

(2, 33973), (10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67, 35266), (68, 35305), (71, 35371),

Gene: GreaseLightnin\_50 Start: 34294, Stop: 35361, Start Num: 14

Candidate Starts for GreaseLightnin\_50:

(2, 33952), (10, 34180), (11, 34201), (12, 34213), (13, 34231), (Start: 14 @34294 has 52 MA's), (19, 34375), (21, 34429), (22, 34435), (24, 34462), (26, 34507), (28, 34525), (29, 34534), (30, 34597), (34, 34744), (36, 34753), (37, 34756), (41, 34819), (42, 34834), (43, 34840), (44, 34858), (45, 34870), (47, 34894), (48, 34903), (50, 34936), (54, 35032), (57, 35053), (61, 35113), (65, 35173), (66, 35188), (67, 35245), (68, 35284), (71, 35350),

Gene: HC\_48 Start: 33423, Stop: 34487, Start Num: 14

Candidate Starts for HC\_48:

(6, 33324), (Start: 14 @33423 has 52 MA's), (19, 33504), (21, 33558), (22, 33564), (26, 33636), (28, 33654), (29, 33663), (30, 33726), (33, 33807), (34, 33873), (36, 33882), (37, 33885), (41, 33948), (42, 33963), (44, 33987), (45, 33999), (47, 34023), (48, 34032), (50, 34065), (51, 34080), (52, 34119), (54,

34161), (58, 34188), (62, 34248), (63, 34287), (64, 34290), (66, 34317), (67, 34374),

Gene: HUHilltop\_51 Start: 34573, Stop: 35640, Start Num: 14

Candidate Starts for HUHilltop\_51:

(2, 34231), (10, 34459), (11, 34480), (12, 34492), (13, 34510), (Start: 14 @34573 has 52 MA's), (19, 34654), (21, 34708), (22, 34714), (24, 34741), (26, 34786), (28, 34804), (29, 34813), (30, 34876), (34, 35023), (36, 35032), (37, 35035), (41, 35098), (42, 35113), (43, 35119), (44, 35137), (45, 35149), (47, 35173), (48, 35182), (50, 35215), (54, 35311), (57, 35332), (61, 35392), (65, 35452), (66, 35467), (67, 35524), (68, 35563), (71, 35629),

Gene: Jebeks\_50 Start: 33870, Stop: 34937, Start Num: 14

Candidate Starts for Jebeks\_50:

(6, 33738), (7, 33741), (Start: 14 @33870 has 52 MA's), (19, 33951), (21, 34005), (26, 34083), (28, 34101), (29, 34110), (30, 34173), (34, 34320), (36, 34329), (37, 34332), (41, 34395), (42, 34410), (43, 34416), (44, 34434), (45, 34446), (47, 34470), (48, 34479), (50, 34512), (54, 34608), (57, 34629), (61, 34689), (65, 34749), (66, 34764), (67, 34821), (68, 34860), (71, 34926),

Gene: Journey\_52 Start: 33187, Stop: 34254, Start Num: 14

Candidate Starts for Journey\_52:

(6, 33055), (7, 33058), (Start: 14 @33187 has 52 MA's), (19, 33268), (21, 33322), (26, 33400), (29, 33427), (30, 33490), (33, 33571), (34, 33637), (36, 33646), (37, 33649), (41, 33712), (42, 33727), (44, 33751), (45, 33763), (47, 33787), (48, 33796), (50, 33829), (51, 33844), (52, 33883), (54, 33925), (57, 33946), (65, 34066), (66, 34081), (67, 34138), (68, 34177), (69, 34189), (70, 34222), (71, 34243),

Gene: Jung\_47 Start: 33738, Stop: 34802, Start Num: 14

Candidate Starts for Jung\_47:

(6, 33639), (Start: 14 @33738 has 52 MA's), (19, 33819), (21, 33873), (26, 33951), (28, 33969), (29, 33978), (30, 34041), (33, 34122), (34, 34188), (36, 34197), (37, 34200), (41, 34263), (42, 34278), (44, 34302), (45, 34314), (47, 34338), (48, 34347), (50, 34380), (51, 34395), (52, 34434), (54, 34476), (58, 34503), (62, 34563), (63, 34602), (64, 34605), (66, 34632), (67, 34689),

Gene: Juniormint\_50 Start: 34087, Stop: 35154, Start Num: 14

Candidate Starts for Juniormint\_50:

(2, 33745), (10, 33973), (11, 33994), (12, 34006), (13, 34024), (Start: 14 @34087 has 52 MA's), (19, 34168), (21, 34222), (22, 34228), (24, 34255), (26, 34300), (28, 34318), (29, 34327), (30, 34390), (34, 34537), (36, 34546), (37, 34549), (41, 34612), (42, 34627), (43, 34633), (44, 34651), (45, 34663), (47, 34687), (48, 34696), (50, 34729), (52, 34783), (54, 34825), (57, 34846), (61, 34906), (65, 34966), (66, 34981), (67, 35038), (68, 35077), (71, 35143),

Gene: Kari\_48 Start: 33807, Stop: 34874, Start Num: 14

Candidate Starts for Kari\_48:

(6, 33675), (7, 33678), (Start: 14 @33807 has 52 MA's), (19, 33888), (21, 33942), (22, 33948), (26, 34020), (28, 34038), (29, 34047), (30, 34110), (33, 34191), (34, 34257), (36, 34266), (37, 34269), (41, 34332), (42, 34347), (44, 34371), (45, 34383), (47, 34407), (48, 34416), (50, 34449), (52, 34503), (54, 34545), (57, 34566), (65, 34686), (66, 34701), (67, 34758), (68, 34797), (69, 34809), (70, 34842), (71, 34863),

Gene: KilKor\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for KilKor\_49:

(2, 33973), (10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67,

35266), (68, 35305), (71, 35371),

Gene: Ksquared\_49 Start: 34065, Stop: 35132, Start Num: 14

Candidate Starts for Ksquared\_49:

(2, 33723), (10, 33951), (11, 33972), (12, 33984), (13, 34002), (Start: 14 @34065 has 52 MA's), (19, 34146), (21, 34200), (22, 34206), (24, 34233), (26, 34278), (28, 34296), (29, 34305), (30, 34368), (34, 34515), (36, 34524), (37, 34527), (41, 34590), (42, 34605), (43, 34611), (44, 34629), (45, 34641), (47, 34665), (48, 34674), (50, 34707), (54, 34803), (57, 34824), (61, 34884), (65, 34944), (66, 34959), (67, 35016), (68, 35055), (71, 35121),

Gene: Langerak\_49 Start: 33826, Stop: 34893, Start Num: 14

Candidate Starts for Langerak\_49:

(6, 33694), (7, 33697), (Start: 14 @33826 has 52 MA's), (19, 33907), (21, 33961), (22, 33967), (26, 34039), (28, 34057), (29, 34066), (30, 34129), (33, 34210), (34, 34276), (36, 34285), (37, 34288), (41, 34351), (42, 34366), (44, 34390), (45, 34402), (47, 34426), (48, 34435), (50, 34468), (52, 34522), (54, 34564), (57, 34585), (65, 34705), (66, 34720), (67, 34777), (68, 34816), (69, 34828), (70, 34861), (71, 34882),

Gene: Majeke\_49 Start: 33851, Stop: 34918, Start Num: 14

Candidate Starts for Majeke\_49:

(6, 33719), (7, 33722), (Start: 14 @33851 has 52 MA's), (19, 33932), (21, 33986), (22, 33992), (26, 34064), (28, 34082), (29, 34091), (30, 34154), (33, 34235), (34, 34301), (36, 34310), (37, 34313), (41, 34376), (42, 34391), (44, 34415), (45, 34427), (47, 34451), (48, 34460), (50, 34493), (52, 34547), (54, 34589), (57, 34610), (65, 34730), (66, 34745), (67, 34802), (68, 34841), (69, 34853), (70, 34886), (71, 34907),

Gene: Malithi\_49 Start: 33783, Stop: 34850, Start Num: 14

Candidate Starts for Malithi\_49:

(10, 33669), (11, 33690), (12, 33702), (13, 33720), (Start: 14 @33783 has 52 MA's), (19, 33864), (21, 33918), (22, 33924), (24, 33951), (26, 33996), (28, 34014), (29, 34023), (30, 34086), (34, 34233), (36, 34242), (37, 34245), (41, 34308), (42, 34323), (43, 34329), (44, 34347), (45, 34359), (47, 34383), (48, 34392), (50, 34425), (54, 34521), (57, 34542), (61, 34602), (65, 34662), (66, 34677), (67, 34734), (68, 34773), (71, 34839),

Gene: Mangethe\_49 Start: 33851, Stop: 34918, Start Num: 14

Candidate Starts for Mangethe\_49:

(6, 33719), (7, 33722), (Start: 14 @33851 has 52 MA's), (19, 33932), (21, 33986), (22, 33992), (26, 34064), (28, 34082), (29, 34091), (30, 34154), (33, 34235), (34, 34301), (36, 34310), (37, 34313), (41, 34376), (42, 34391), (44, 34415), (45, 34427), (47, 34451), (48, 34460), (50, 34493), (52, 34547), (54, 34589), (57, 34610), (65, 34730), (66, 34745), (67, 34802), (68, 34841), (69, 34853), (70, 34886), (71, 34907),

Gene: Megiddo\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for Megiddo\_49:

(2, 33973), (10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67, 35266), (68, 35305), (71, 35371),

Gene: Nazo\_52 Start: 36235, Stop: 37299, Start Num: 14

Candidate Starts for Nazo\_52:



(1, 35818), (2, 35899), (6, 36055), (10, 36121), (11, 36142), (12, 36154), (13, 36172), (Start: 14 @36235 has 52 MA's), (19, 36316), (21, 36370), (29, 36475), (30, 36538), (34, 36685), (36, 36694), (37, 36697), (41, 36760), (42, 36775), (44, 36799), (45, 36811), (47, 36835), (48, 36844), (50, 36877), (51, 36892), (52, 36931), (54, 36973), (57, 36994), (59, 37021), (60, 37030), (63, 37099), (64, 37102), (66, 37129), (67, 37186),

Gene: Necropolis\_48 Start: 33939, Stop: 35006, Start Num: 14

Candidate Starts for Necropolis\_48:

(10, 33825), (11, 33846), (12, 33858), (13, 33876), (Start: 14 @33939 has 52 MA's), (19, 34020), (21, 34074), (22, 34080), (24, 34107), (26, 34152), (28, 34170), (29, 34179), (30, 34242), (34, 34389), (36, 34398), (37, 34401), (41, 34464), (42, 34479), (43, 34485), (44, 34503), (45, 34515), (47, 34539), (48, 34548), (50, 34581), (54, 34677), (57, 34698), (61, 34758), (65, 34818), (66, 34833), (67, 34890), (68, 34929), (71, 34995),

Gene: Phalm\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for Phalm\_49:

(2, 33973), (10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67, 35266), (68, 35305), (71, 35371),

Gene: Phegasus\_49 Start: 33818, Stop: 34885, Start Num: 14

Candidate Starts for Phegasus\_49:

(6, 33686), (7, 33689), (Start: 14 @33818 has 52 MA's), (19, 33899), (21, 33953), (22, 33959), (26, 34031), (28, 34049), (29, 34058), (30, 34121), (33, 34202), (34, 34268), (36, 34277), (37, 34280), (41, 34343), (42, 34358), (44, 34382), (45, 34394), (47, 34418), (48, 34427), (50, 34460), (52, 34514), (54, 34556), (57, 34577), (65, 34697), (66, 34712), (67, 34769), (68, 34808), (69, 34820), (70, 34853), (71, 34874),

Gene: Philonius\_51 Start: 33185, Stop: 34252, Start Num: 14

Candidate Starts for Philonius\_51:

(2, 32843), (10, 33071), (11, 33092), (12, 33104), (13, 33122), (Start: 14 @33185 has 52 MA's), (19, 33266), (21, 33320), (22, 33326), (24, 33353), (26, 33398), (28, 33416), (29, 33425), (30, 33488), (34, 33635), (36, 33644), (37, 33647), (41, 33710), (42, 33725), (43, 33731), (44, 33749), (45, 33761), (47, 33785), (48, 33794), (50, 33827), (54, 33923), (57, 33944), (61, 34004), (65, 34064), (66, 34079), (67, 34136), (68, 34175), (71, 34241),

Gene: Phineas\_51 Start: 34908, Stop: 35975, Start Num: 14

Candidate Starts for Phineas\_51:

(2, 34566), (10, 34794), (11, 34815), (12, 34827), (13, 34845), (Start: 14 @34908 has 52 MA's), (19, 34989), (21, 35043), (22, 35049), (24, 35076), (26, 35121), (28, 35139), (29, 35148), (30, 35211), (34, 35358), (36, 35367), (37, 35370), (41, 35433), (42, 35448), (43, 35454), (44, 35472), (45, 35484), (47, 35508), (48, 35517), (50, 35550), (54, 35646), (57, 35667), (61, 35727), (65, 35787), (66, 35802), (67, 35859), (68, 35898), (71, 35964),

Gene: Polkaroo\_49 Start: 33814, Stop: 34881, Start Num: 14

Candidate Starts for Polkaroo\_49:

(6, 33682), (7, 33685), (Start: 14 @33814 has 52 MA's), (19, 33895), (21, 33949), (26, 34027), (28, 34045), (29, 34054), (30, 34117), (33, 34198), (34, 34264), (36, 34273), (37, 34276), (41, 34339), (42, 34354), (44, 34378), (45, 34390), (47, 34414), (48, 34423), (50, 34456), (52, 34510), (54, 34552), (57, 34573), (65, 34693), (66, 34708), (67, 34765), (68, 34804), (69, 34816), (70, 34849), (71, 34870),

Gene: Purky\_55 Start: 36615, Stop: 37688, Start Num: 15

Candidate Starts for Purky\_55:

(Start: 15 @36615 has 2 MA's), (16, 36642), (19, 36693), (20, 36741), (25, 36822), (26, 36825), (27, 36840), (29, 36852), (31, 36918), (32, 36978), (38, 37113), (39, 37119), (40, 37125), (41, 37140), (42, 37155), (43, 37161), (44, 37179), (45, 37191), (46, 37212), (48, 37224), (49, 37251), (50, 37257), (51, 37272), (52, 37311), (53, 37344), (54, 37356), (56, 37371), (57, 37377), (58, 37383), (59, 37404), (63, 37482), (64, 37485), (65, 37497), (66, 37512), (67, 37569),

Gene: Pygmy\_53 Start: 36372, Stop: 37439, Start Num: 14

Candidate Starts for Pygmy\_53:

(2, 36030), (10, 36258), (11, 36279), (12, 36291), (13, 36309), (Start: 14 @36372 has 52 MA's), (19, 36453), (21, 36507), (22, 36513), (24, 36540), (26, 36585), (28, 36603), (30, 36675), (34, 36822), (36, 36831), (37, 36834), (41, 36897), (42, 36912), (43, 36918), (44, 36936), (45, 36948), (47, 36972), (48, 36981), (50, 37014), (54, 37110), (57, 37131), (61, 37191), (65, 37251), (66, 37266), (67, 37323), (68, 37362), (71, 37428),

Gene: QueenHazel\_46 Start: 33941, Stop: 35005, Start Num: 14

Candidate Starts for QueenHazel\_46:

(6, 33842), (7, 33845), (Start: 14 @33941 has 52 MA's), (19, 34022), (21, 34076), (26, 34154), (28, 34172), (29, 34181), (30, 34244), (33, 34325), (34, 34391), (36, 34400), (37, 34403), (41, 34466), (42, 34481), (44, 34505), (45, 34517), (47, 34541), (48, 34550), (50, 34583), (51, 34598), (52, 34637), (54, 34679), (58, 34706), (62, 34766), (63, 34805), (64, 34808), (66, 34835), (67, 34892),

Gene: Rebel\_46 Start: 31800, Stop: 32864, Start Num: 14

Candidate Starts for Rebel\_46:

(6, 31701), (Start: 14 @31800 has 52 MA's), (19, 31881), (21, 31935), (22, 31941), (26, 32013), (28, 32031), (29, 32040), (30, 32103), (33, 32184), (34, 32250), (36, 32259), (37, 32262), (41, 32325), (42, 32340), (44, 32364), (45, 32376), (47, 32400), (48, 32409), (50, 32442), (51, 32457), (52, 32496), (54, 32538), (58, 32565), (62, 32625), (63, 32664), (64, 32667), (66, 32694), (67, 32751),

Gene: Sejanus\_65 Start: 50618, Stop: 51691, Start Num: 15

Candidate Starts for Sejanus\_65:

(Start: 15 @50618 has 2 MA's), (16, 50645), (19, 50696), (20, 50744), (23, 50780), (24, 50783), (25, 50825), (26, 50828), (27, 50843), (29, 50855), (31, 50921), (32, 50981), (34, 51065), (39, 51122), (40, 51128), (41, 51143), (42, 51158), (43, 51164), (44, 51182), (45, 51194), (48, 51227), (49, 51254), (50, 51260), (51, 51275), (52, 51314), (54, 51359), (56, 51374), (57, 51380), (58, 51386), (59, 51407), (63, 51485), (64, 51488), (65, 51500), (66, 51515), (67, 51572), (69, 51623),

Gene: Shipwreck\_53 Start: 36347, Stop: 37414, Start Num: 14

Candidate Starts for Shipwreck\_53:

(2, 36005), (10, 36233), (11, 36254), (12, 36266), (13, 36284), (Start: 14 @36347 has 52 MA's), (19, 36428), (21, 36482), (22, 36488), (24, 36515), (26, 36560), (28, 36578), (29, 36587), (30, 36650), (34, 36797), (36, 36806), (37, 36809), (41, 36872), (42, 36887), (43, 36893), (44, 36911), (45, 36923), (47, 36947), (48, 36956), (50, 36989), (54, 37085), (57, 37106), (61, 37166), (65, 37226), (66, 37241), (67, 37298), (68, 37337), (71, 37403),

Gene: Shweta\_48 Start: 33731, Stop: 34795, Start Num: 14

Candidate Starts for Shweta\_48:

(6, 33632), (Start: 14 @33731 has 52 MA's), (19, 33812), (21, 33866), (22, 33872), (26, 33944), (28, 33962), (29, 33971), (30, 34034), (33, 34115), (34, 34181), (36, 34190), (37, 34193), (41, 34256), (42, 34271), (44, 34295), (45, 34307), (47, 34331), (48, 34340), (50, 34373), (51, 34388), (52, 34427), (54, 34469), (58, 34496), (62, 34556), (63, 34595), (64, 34598), (66, 34625), (67, 34682),

Gene: Silvy\_49 Start: 33656, Stop: 34723, Start Num: 14

Candidate Starts for Silvy\_49:

(2, 33314), (10, 33542), (11, 33563), (12, 33575), (13, 33593), (Start: 14 @33656 has 52 MA's), (19, 33737), (21, 33791), (22, 33797), (24, 33824), (26, 33869), (28, 33887), (29, 33896), (30, 33959), (34, 34106), (36, 34115), (37, 34118), (41, 34181), (42, 34196), (43, 34202), (44, 34220), (45, 34232), (47, 34256), (48, 34265), (50, 34298), (54, 34394), (57, 34415), (61, 34475), (65, 34535), (66, 34550), (67, 34607), (68, 34646), (71, 34712),

Gene: Sonah\_50 Start: 34044, Stop: 35111, Start Num: 14

Candidate Starts for Sonah\_50:

(2, 33702), (10, 33930), (11, 33951), (12, 33963), (13, 33981), (Start: 14 @34044 has 52 MA's), (19, 34125), (21, 34179), (22, 34185), (24, 34212), (26, 34257), (28, 34275), (29, 34284), (30, 34347), (34, 34494), (36, 34503), (37, 34506), (41, 34569), (42, 34584), (43, 34590), (44, 34608), (45, 34620), (47, 34644), (48, 34653), (50, 34686), (54, 34782), (57, 34803), (61, 34863), (65, 34923), (66, 34938), (67, 34995), (68, 35034), (71, 35100),

Gene: StevieRay\_49 Start: 34017, Stop: 35084, Start Num: 14

Candidate Starts for StevieRay\_49:

(2, 33675), (10, 33903), (11, 33924), (12, 33936), (13, 33954), (Start: 14 @34017 has 52 MA's), (19, 34098), (21, 34152), (22, 34158), (24, 34185), (26, 34230), (28, 34248), (29, 34257), (30, 34320), (36, 34476), (37, 34479), (41, 34542), (42, 34557), (43, 34563), (44, 34581), (45, 34593), (47, 34617), (48, 34626), (50, 34659), (54, 34755), (57, 34776), (61, 34836), (65, 34896), (66, 34911), (67, 34968), (68, 35007), (71, 35073),

Gene: StressBall\_49 Start: 34315, Stop: 35382, Start Num: 14

Candidate Starts for StressBall\_49:

(10, 34201), (11, 34222), (12, 34234), (13, 34252), (Start: 14 @34315 has 52 MA's), (19, 34396), (21, 34450), (22, 34456), (24, 34483), (26, 34528), (28, 34546), (29, 34555), (30, 34618), (34, 34765), (36, 34774), (37, 34777), (41, 34840), (42, 34855), (43, 34861), (44, 34879), (45, 34891), (47, 34915), (48, 34924), (50, 34957), (54, 35053), (57, 35074), (61, 35134), (65, 35194), (66, 35209), (67, 35266), (68, 35305), (71, 35371),

Gene: Techage\_48 Start: 33836, Stop: 34903, Start Num: 14

Candidate Starts for Techage\_48:

(6, 33704), (7, 33707), (Start: 14 @33836 has 52 MA's), (19, 33917), (21, 33971), (26, 34049), (28, 34067), (29, 34076), (30, 34139), (33, 34220), (34, 34286), (36, 34295), (37, 34298), (41, 34361), (42, 34376), (44, 34400), (45, 34412), (47, 34436), (48, 34445), (50, 34478), (52, 34532), (54, 34574), (57, 34595), (65, 34715), (66, 34730), (67, 34787), (68, 34826), (69, 34838), (70, 34871), (71, 34892),

Gene: Thespis\_49 Start: 34051, Stop: 35118, Start Num: 14

Candidate Starts for Thespis\_49:

(10, 33937), (11, 33958), (12, 33970), (13, 33988), (Start: 14 @34051 has 52 MA's), (19, 34132), (21, 34186), (22, 34192), (24, 34219), (26, 34264), (28, 34282), (29, 34291), (30, 34354), (34, 34501), (36, 34510), (37, 34513), (41, 34576), (42, 34591), (43, 34597), (44, 34615), (45, 34627), (47, 34651), (48, 34660), (50, 34693), (52, 34747), (54, 34789), (57, 34810), (61, 34870), (65, 34930), (66, 34945), (67, 35002), (68, 35041), (71, 35107),

Gene: ThulaThula\_56 Start: 38659, Stop: 39723, Start Num: 14

Candidate Starts for ThulaThula\_56:

(6, 38545), (7, 38548), (Start: 14 @38659 has 52 MA's), (17, 38710), (19, 38740), (20, 38788), (22, 38800), (26, 38872), (28, 38890), (29, 38899), (30, 38962), (34, 39109), (35, 39112), (36, 39118), (37, 39121), (39, 39163), (41, 39184), (42, 39199), (44, 39223), (45, 39235), (47, 39259), (48, 39268), (51, 39316), (52, 39355), (54, 39397), (57, 39418), (58, 39424), (59, 39445), (60, 39454), (65, 39538), (66,

39553), (67, 39610),

Gene: Venti\_49 Start: 33810, Stop: 34877, Start Num: 14

Candidate Starts for Venti\_49:

(6, 33678), (7, 33681), (Start: 14 @33810 has 52 MA's), (19, 33891), (21, 33945), (22, 33951), (26, 34023), (28, 34041), (29, 34050), (30, 34113), (33, 34194), (34, 34260), (36, 34269), (37, 34272), (41, 34335), (42, 34350), (44, 34374), (45, 34386), (47, 34410), (48, 34419), (50, 34452), (52, 34506), (54, 34548), (57, 34569), (65, 34689), (66, 34704), (67, 34761), (68, 34800), (69, 34812), (70, 34845), (71, 34866),

Gene: Vidya\_48 Start: 33843, Stop: 34907, Start Num: 14

Candidate Starts for Vidya\_48:

(6, 33711), (7, 33714), (Start: 14 @33843 has 52 MA's), (19, 33924), (21, 33978), (22, 33984), (26, 34056), (28, 34074), (29, 34083), (30, 34146), (33, 34227), (34, 34293), (36, 34302), (37, 34305), (41, 34368), (42, 34383), (44, 34407), (45, 34419), (47, 34443), (48, 34452), (50, 34485), (51, 34500), (52, 34539), (54, 34581), (58, 34608), (62, 34668), (63, 34707), (64, 34710), (66, 34737), (67, 34794),

Gene: Willsammy\_48 Start: 33798, Stop: 34865, Start Num: 14

Candidate Starts for Willsammy\_48:

(2, 33456), (10, 33684), (11, 33705), (12, 33717), (13, 33735), (Start: 14 @33798 has 52 MA's), (19, 33879), (21, 33933), (22, 33939), (24, 33966), (26, 34011), (28, 34029), (29, 34038), (30, 34101), (34, 34248), (36, 34257), (37, 34260), (41, 34323), (42, 34338), (43, 34344), (44, 34362), (45, 34374), (47, 34398), (48, 34407), (50, 34440), (54, 34536), (57, 34557), (61, 34617), (65, 34677), (66, 34692), (67, 34749), (68, 34788), (71, 34854),

Gene: Xeno\_51 Start: 33393, Stop: 34460, Start Num: 14

Candidate Starts for Xeno\_51:

(10, 33279), (11, 33300), (12, 33312), (13, 33330), (Start: 14 @33393 has 52 MA's), (19, 33474), (21, 33528), (22, 33534), (24, 33561), (26, 33606), (28, 33624), (29, 33633), (30, 33696), (34, 33843), (36, 33852), (37, 33855), (41, 33918), (42, 33933), (43, 33939), (44, 33957), (45, 33969), (47, 33993), (48, 34002), (50, 34035), (52, 34089), (54, 34131), (57, 34152), (61, 34212), (65, 34272), (66, 34287), (67, 34344), (68, 34383), (71, 34449),

Gene: Xula\_45 Start: 33543, Stop: 34607, Start Num: 14

Candidate Starts for Xula\_45:

(6, 33444), (7, 33447), (Start: 14 @33543 has 52 MA's), (19, 33624), (21, 33678), (26, 33756), (28, 33774), (29, 33783), (30, 33846), (33, 33927), (34, 33993), (36, 34002), (37, 34005), (41, 34068), (42, 34083), (44, 34107), (45, 34119), (47, 34143), (48, 34152), (50, 34185), (51, 34200), (52, 34239), (54, 34281), (58, 34308), (62, 34368), (63, 34407), (64, 34410), (66, 34437), (67, 34494),

Gene: Zilizebeth\_49 Start: 33842, Stop: 34909, Start Num: 14

Candidate Starts for Zilizebeth\_49:

(6, 33710), (7, 33713), (Start: 14 @33842 has 52 MA's), (19, 33923), (21, 33977), (22, 33983), (26, 34055), (28, 34073), (29, 34082), (30, 34145), (33, 34226), (34, 34292), (36, 34301), (37, 34304), (41, 34367), (42, 34382), (44, 34406), (45, 34418), (47, 34442), (48, 34451), (50, 34484), (52, 34538), (54, 34580), (57, 34601), (65, 34721), (66, 34736), (67, 34793), (68, 34832), (69, 34844), (70, 34877), (71, 34898),