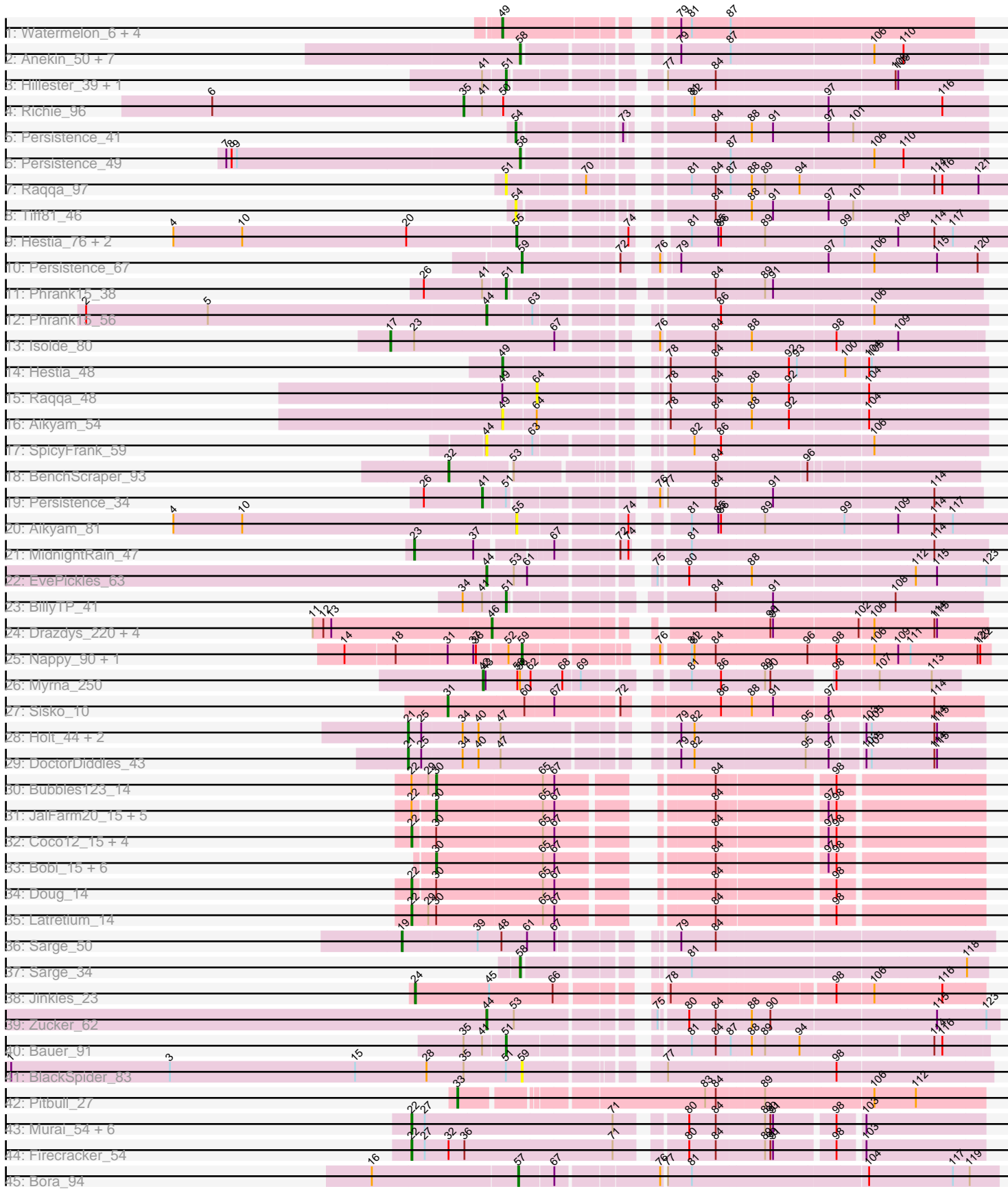


Pham 196463



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 196463 Report

This analysis was run 12/09/24 on database version 580.

Pham number 196463 has 87 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Watermelon\_6, Trouble\_4, Tripl3t\_5, Peterson\_6, Alsfro\_7
- Track 2 : Anekin\_50, BillyTP\_55, Faja\_54, RadFad\_57, BenchScraper\_52, Raqqa\_45, Hillester\_57, MidnightRain\_57
- Track 3 : Hillester\_39, RadFad\_39
- Track 4 : Richie\_96
- Track 5 : Persistence\_41
- Track 6 : Persistence\_49
- Track 7 : Raqqa\_97
- Track 8 : Tiff81\_46
- Track 9 : Hestia\_76, BillyTP\_83, Lawnathon\_82
- Track 10 : Persistence\_67
- Track 11 : Phrank15\_38
- Track 12 : Phrank15\_56
- Track 13 : Isolde\_80
- Track 14 : Hestia\_48
- Track 15 : Raqqa\_48
- Track 16 : Aikyam\_54
- Track 17 : SpicyFrank\_59
- Track 18 : BenchScraper\_93
- Track 19 : Persistence\_34
- Track 20 : Aikyam\_81
- Track 21 : MidnightRain\_47
- Track 22 : EvePickles\_63
- Track 23 : BillyTP\_41
- Track 24 : Drazdys\_220, ShiaLabeouf\_219, Nappy\_223, Ading\_223, Jemmno\_221
- Track 25 : Nappy\_90, Cane17\_77
- Track 26 : Myrna\_250
- Track 27 : Sisko\_10
- Track 28 : Holt\_44, Sunshine924\_65, Flabslab\_17
- Track 29 : DoctorDiddles\_43
- Track 30 : Bubbles123\_14
- Track 31 : JalFarm20\_15, Alexphander\_15, Polka14\_14, DaWorst\_15, OwlsT2W\_15, Phasih\_14
- Track 32 : Coco12\_15, Job42\_15, Minnie\_14, BuzzLyseyear\_15, SuperGrey\_14
- Track 33 : Bobi\_15, Wee\_14, Phatniss\_14, Sandalphon\_14, Rialto\_15, Firehouse51\_14, Moonbeam\_14
- Track 34 : Doug\_14

- Track 35 : Latretium\_14
- Track 36 : Sarge\_50
- Track 37 : Sarge\_34
- Track 38 : Jinkies\_23
- Track 39 : Zucker\_62
- Track 40 : Bauer\_91
- Track 41 : BlackSpider\_83
- Track 42 : Pitbull\_27
- Track 43 : Murai\_54, Corndog\_56, Smooch\_56, YungJamal\_57, Ashwin\_55, Vorrps\_53, Mori\_53
- Track 44 : Firecracker\_54
- Track 45 : Bora\_94

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

The start number called the most often in the published annotations is 22, it was called in 15 of the 76 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Ashwin\_55, BuzzLyseyear\_15, Coco12\_15, Corndog\_56, Doug\_14, Firecracker\_54, Job42\_15, Latretium\_14, Minnie\_14, Mori\_53, Murai\_54, Smooch\_56, SuperGrey\_14, Vorrps\_53, YungJamal\_57,

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

- Alexphander\_15, Bubbles123\_14, DaWorst\_15, JalFarm20\_15, OwlsT2W\_15, Phasih\_14, Polka14\_14,

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

- Ading\_223, Aikyam\_54, Aikyam\_81, Alsfro\_7, Anekin\_50, Bauer\_91, BenchScraper\_52, BenchScraper\_93, BillyTP\_41, BillyTP\_55, BillyTP\_83, BlackSpider\_83, Bobi\_15, Bora\_94, Cane17\_77, DoctorDiddles\_43, Drazdys\_220, EvePickles\_63, Faja\_54, Firehouse51\_14, Flabslab\_17, Hestia\_48, Hestia\_76, Hillester\_39, Hillester\_57, Holt\_44, Isolde\_80, Jemmno\_221, Jinkies\_23, Lawnathon\_82, MidnightRain\_47, MidnightRain\_57, Moonbeam\_14, Myrna\_250, Nappy\_223, Nappy\_90, Persistence\_34, Persistence\_41, Persistence\_49, Persistence\_67, Peterson\_6, Phatniss\_14, Phrank15\_38, Phrank15\_56, Pitbull\_27, RadFad\_39, RadFad\_57, Raqqa\_45, Raqqa\_48, Raqqa\_97, Rialto\_15, Richie\_96, Sandalphon\_14, Sarge\_34, Sarge\_50, ShiaLabeouf\_219, Sisko\_10, SpicyFrank\_59, Sunshine924\_65, Tiff81\_46, Tripl3t\_5, Trouble\_4, Watermelon\_6, Wee\_14, Zucker\_62,

**Summary by start number:**

Start 17:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Isolde\_80 (AY),

Start 19:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Sarge\_50 (FB),

#### Start 21:

- Found in 4 of 87 ( 4.6% ) of genes in pham
- Manual Annotations of this start: 4 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: DoctorDiddles\_43 (E), Flabslab\_17 (C1), Holt\_44 (E), Sunshine924\_65 (A1),

#### Start 22:

- Found in 22 of 87 ( 25.3% ) of genes in pham
- Manual Annotations of this start: 15 of 76
- Called 68.2% of time when present
- Phage (with cluster) where this start called: Ashwin\_55 (O), BuzzLyseyear\_15 (F1), Coco12\_15 (F1), Corndog\_56 (O), Doug\_14 (F1), Firecracker\_54 (O), Job42\_15 (F1), Latretium\_14 (F1), Minnie\_14 (F1), Mori\_53 (O), Murai\_54 (O), Smooch\_56 (O), SuperGrey\_14 (F1), Vorrps\_53 (O), YungJamal\_57 (O),

#### Start 23:

- Found in 2 of 87 ( 2.3% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 50.0% of time when present
- Phage (with cluster) where this start called: MidnightRain\_47 (AY),

#### Start 24:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Jinkies\_23 (FL),

#### Start 30:

- Found in 21 of 87 ( 24.1% ) of genes in pham
- Manual Annotations of this start: 14 of 76
- Called 66.7% of time when present
- Phage (with cluster) where this start called: Alexphander\_15 (F1), Bobi\_15 (F1), Bubbles123\_14 (F1), DaWorst\_15 (F1), Firehouse51\_14 (F1), JalFarm20\_15 (F1), Moonbeam\_14 (F1), OwlsT2W\_15 (F1), Phasih\_14 (F1), Phatniss\_14 (F1), Polka14\_14 (F1), Rialto\_15 (F1), Sandalphon\_14 (F1), Wee\_14 (F1),

#### Start 31:

- Found in 3 of 87 ( 3.4% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Sisko\_10 (DR),

#### Start 32:

- Found in 2 of 87 ( 2.3% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 50.0% of time when present
- Phage (with cluster) where this start called: BenchScraper\_93 (AY),

Start 33:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Pitbull\_27 (FQ),

Start 35:

- Found in 3 of 87 ( 3.4% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Richie\_96 (AY),

Start 41:

- Found in 7 of 87 ( 8.0% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 14.3% of time when present
- Phage (with cluster) where this start called: Persistence\_34 (AY),

Start 42:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Myrna\_250 (C2),

Start 44:

- Found in 4 of 87 ( 4.6% ) of genes in pham
- Manual Annotations of this start: 3 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: EvePickles\_63 (AY), Phrank15\_56 (AY), SpicyFrank\_59 (AY), Zucker\_62 (FN),

Start 46:

- Found in 5 of 87 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 5 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ading\_223 (C1), Drazdys\_220 (C1), Jemmno\_221 (C1), Nappy\_223 (C1), ShiaLabeouf\_219 (C1),

Start 49:

- Found in 8 of 87 ( 9.2% ) of genes in pham
- Manual Annotations of this start: 6 of 76
- Called 87.5% of time when present
- Phage (with cluster) where this start called: Aikyam\_54 (AY), Alsfro\_7 (A1), Hestia\_48 (AY), Peterson\_6 (A1), Trip13t\_5 (A1), Trouble\_4 (A1), Watermelon\_6 (A1),

Start 51:

- Found in 8 of 87 ( 9.2% ) of genes in pham
- Manual Annotations of this start: 4 of 76
- Called 75.0% of time when present
- Phage (with cluster) where this start called: Bauer\_91 (FN), BillyTP\_41 (AY), Hillester\_39 (AY), Phrank15\_38 (AY), RadFad\_39 (AY), Raqqa\_97 (AY),

Start 54:

- Found in 2 of 87 ( 2.3% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Persistence\_41 (AY), Tiff81\_46 (AY),

Start 55:

- Found in 4 of 87 ( 4.6% ) of genes in pham
- Manual Annotations of this start: 2 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aikyam\_81 (AY), BillyTP\_83 (AY), Hestia\_76 (AY), Lawnathon\_82 (AY),

Start 57:

- Found in 1 of 87 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Bora\_94 (O),

Start 58:

- Found in 11 of 87 ( 12.6% ) of genes in pham
- Manual Annotations of this start: 8 of 76
- Called 90.9% of time when present
- Phage (with cluster) where this start called: Anekin\_50 (AY), BenchScraper\_52 (AY), BillyTP\_55 (AY), Faja\_54 (AY), Hillester\_57 (AY), MidnightRain\_57 (AY), Persistence\_49 (AY), RadFad\_57 (AY), Raqqa\_45 (AY), Sarge\_34 (FB),

Start 59:

- Found in 4 of 87 ( 4.6% ) of genes in pham
- Manual Annotations of this start: 3 of 76
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BlackSpider\_83 (FN), Cane17\_77 (C1), Nappy\_90 (C1), Persistence\_67 (AY),

Start 64:

- Found in 2 of 87 ( 2.3% ) of genes in pham
- No Manual Annotations of this start.
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Raqqa\_48 (AY),

**Summary by clusters:**

There are 12 clusters represented in this pham: F1, E, FQ, FL, O, A1, FB, AY, C2, C1, DR, FN,

Info for manual annotations of cluster A1:

- Start number 21 was manually annotated 1 time for cluster A1.
- Start number 49 was manually annotated 5 times for cluster A1.

Info for manual annotations of cluster AY:

- Start number 17 was manually annotated 1 time for cluster AY.
- Start number 23 was manually annotated 1 time for cluster AY.
- Start number 32 was manually annotated 1 time for cluster AY.

- Start number 35 was manually annotated 1 time for cluster AY.
- Start number 41 was manually annotated 1 time for cluster AY.
- Start number 44 was manually annotated 2 times for cluster AY.
- Start number 49 was manually annotated 1 time for cluster AY.
- Start number 51 was manually annotated 3 times for cluster AY.
- Start number 54 was manually annotated 1 time for cluster AY.
- Start number 55 was manually annotated 2 times for cluster AY.
- Start number 58 was manually annotated 7 times for cluster AY.
- Start number 59 was manually annotated 1 time for cluster AY.

Info for manual annotations of cluster C1:

- Start number 21 was manually annotated 1 time for cluster C1.
- Start number 46 was manually annotated 5 times for cluster C1.
- Start number 59 was manually annotated 2 times for cluster C1.

Info for manual annotations of cluster C2:

- Start number 42 was manually annotated 1 time for cluster C2.

Info for manual annotations of cluster DR:

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

Info for manual annotations of cluster E:

- Start number 21 was manually annotated 2 times for cluster E.

Info for manual annotations of cluster F1:

- Start number 22 was manually annotated 7 times for cluster F1.
- Start number 30 was manually annotated 14 times for cluster F1.

Info for manual annotations of cluster FB:

- Start number 19 was manually annotated 1 time for cluster FB.
- Start number 58 was manually annotated 1 time for cluster FB.

Info for manual annotations of cluster FL:

- Start number 24 was manually annotated 1 time for cluster FL.

Info for manual annotations of cluster FN:

- Start number 44 was manually annotated 1 time for cluster FN.
- Start number 51 was manually annotated 1 time for cluster FN.

Info for manual annotations of cluster FQ:

- Start number 33 was manually annotated 1 time for cluster FQ.

Info for manual annotations of cluster O:

- Start number 22 was manually annotated 8 times for cluster O.
- Start number 57 was manually annotated 1 time for cluster O.

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

Gene: Ading\_223 Start: 126625, Stop: 127119, Start Num: 46

Candidate Starts for Ading\_223:

(11, 126424), (12, 126436), (13, 126445), (Start: 46 @126625 has 5 MA's), (90, 126883), (91, 126886), (102, 126979), (106, 126994), (114, 127060), (115, 127063),

Gene: Aikyam\_54 Start: 31109, Stop: 31600, Start Num: 49

Candidate Starts for Aikyam\_54:

(Start: 49 @31109 has 6 MA's), (64, 31145), (78, 31256), (84, 31307), (88, 31343), (92, 31385), (104, 31469),

Gene: Aikyam\_81 Start: 44887, Stop: 45402, Start Num: 55

Candidate Starts for Aikyam\_81:

(4, 44503), (10, 44581), (Start: 55 @44887 has 2 MA's), (74, 44995), (81, 45037), (85, 45067), (86, 45070), (89, 45115), (99, 45202), (109, 45259), (114, 45298), (117, 45319),

Gene: Alexphander\_15 Start: 9340, Stop: 9879, Start Num: 30

Candidate Starts for Alexphander\_15:

(Start: 22 @9319 has 15 MA's), (Start: 30 @9340 has 14 MA's), (65, 9457), (67, 9469), (84, 9601), (97, 9715), (98, 9724),

Gene: Alsfro\_7 Start: 2250, Stop: 2729, Start Num: 49

Candidate Starts for Alsfro\_7:

(Start: 49 @2250 has 6 MA's), (79, 2409), (81, 2421), (87, 2463),

Gene: Anekin\_50 Start: 31927, Stop: 32388, Start Num: 58

Candidate Starts for Anekin\_50:

(Start: 58 @31927 has 8 MA's), (79, 32059), (87, 32113), (106, 32266), (110, 32299),

Gene: Ashwin\_55 Start: 26608, Stop: 27207, Start Num: 22

Candidate Starts for Ashwin\_55:

(Start: 22 @26608 has 15 MA's), (27, 26623), (71, 26833), (80, 26896), (84, 26926), (89, 26980), (90, 26986), (91, 26989), (98, 27052), (103, 27076),

Gene: Bauer\_91 Start: 48793, Stop: 49275, Start Num: 51

Candidate Starts for Bauer\_91:

(Start: 35 @48748 has 1 MA's), (Start: 41 @48769 has 1 MA's), (Start: 51 @48793 has 4 MA's), (81, 48958), (84, 48985), (87, 49000), (88, 49021), (89, 49036), (94, 49075), (114, 49216), (116, 49225),

Gene: BenchScraper\_52 Start: 31813, Stop: 32274, Start Num: 58

Candidate Starts for BenchScraper\_52:

(Start: 58 @31813 has 8 MA's), (79, 31945), (87, 31999), (106, 32152), (110, 32185),

Gene: BenchScraper\_93 Start: 49693, Stop: 50208, Start Num: 32

Candidate Starts for BenchScraper\_93:

(Start: 32 @49693 has 1 MA's), (53, 49759), (84, 49933), (96, 50029),

Gene: BillyTP\_55 Start: 33684, Stop: 34145, Start Num: 58

Candidate Starts for BillyTP\_55:

(Start: 58 @33684 has 8 MA's), (79, 33816), (87, 33870), (106, 34023), (110, 34056),

Gene: BillyTP\_83 Start: 47477, Stop: 47989, Start Num: 55

Candidate Starts for BillyTP\_83:

(4, 47093), (10, 47171), (20, 47357), (Start: 55 @47477 has 2 MA's), (74, 47585), (81, 47627), (85, 47657), (86, 47660), (89, 47705), (99, 47792), (109, 47849), (114, 47888), (117, 47909),



Gene: BillyTP\_41 Start: 27467, Stop: 27946, Start Num: 51

Candidate Starts for BillyTP\_41:

(34, 27422), (Start: 41 @27443 has 1 MA's), (Start: 51 @27467 has 4 MA's), (84, 27659), (91, 27719), (108, 27851),

Gene: BlackSpider\_83 Start: 48806, Stop: 49288, Start Num: 59

Candidate Starts for BlackSpider\_83:

(1, 48227), (3, 48407), (15, 48617), (28, 48698), (Start: 35 @48740 has 1 MA's), (Start: 51 @48788 has 4 MA's), (Start: 59 @48806 has 3 MA's), (77, 48935), (98, 49118),

Gene: Bobi\_15 Start: 9361, Stop: 9900, Start Num: 30

Candidate Starts for Bobi\_15:

(Start: 30 @9361 has 14 MA's), (65, 9478), (67, 9490), (84, 9622), (97, 9736), (98, 9745),

Gene: Bora\_94 Start: 59313, Stop: 58804, Start Num: 57

Candidate Starts for Bora\_94:

(16, 59475), (Start: 57 @59313 has 1 MA's), (67, 59277), (76, 59169), (77, 59166), (81, 59139), (104, 58947), (117, 58854), (119, 58836),

Gene: Bubbles123\_14 Start: 9517, Stop: 10056, Start Num: 30

Candidate Starts for Bubbles123\_14:

(Start: 22 @9490 has 15 MA's), (29, 9508), (Start: 30 @9517 has 14 MA's), (65, 9634), (67, 9646), (84, 9778), (98, 9901),

Gene: BuzzLyseyear\_15 Start: 9319, Stop: 9879, Start Num: 22

Candidate Starts for BuzzLyseyear\_15:

(Start: 22 @9319 has 15 MA's), (Start: 30 @9340 has 14 MA's), (65, 9457), (67, 9469), (84, 9601), (97, 9715), (98, 9724),

Gene: Cane17\_77 Start: 32003, Stop: 32473, Start Num: 59

Candidate Starts for Cane17\_77:

(14, 31814), (18, 31868), (Start: 31 @31925 has 1 MA's), (37, 31952), (38, 31955), (52, 31988), (Start: 59 @32003 has 3 MA's), (76, 32117), (81, 32147), (82, 32150), (84, 32174), (96, 32276), (98, 32306), (106, 32345), (109, 32372), (111, 32384), (120, 32459), (122, 32462),

Gene: Coco12\_15 Start: 9318, Stop: 9878, Start Num: 22

Candidate Starts for Coco12\_15:

(Start: 22 @9318 has 15 MA's), (Start: 30 @9339 has 14 MA's), (65, 9456), (67, 9468), (84, 9600), (97, 9714), (98, 9723),

Gene: Corndog\_56 Start: 27158, Stop: 27757, Start Num: 22

Candidate Starts for Corndog\_56:

(Start: 22 @27158 has 15 MA's), (27, 27173), (71, 27383), (80, 27446), (84, 27476), (89, 27530), (90, 27536), (91, 27539), (98, 27602), (103, 27626),

Gene: DaWorst\_15 Start: 9345, Stop: 9884, Start Num: 30

Candidate Starts for DaWorst\_15:

(Start: 22 @9324 has 15 MA's), (Start: 30 @9345 has 14 MA's), (65, 9462), (67, 9474), (84, 9606), (97, 9720), (98, 9729),

Gene: DoctorDiddles\_43 Start: 34776, Stop: 34189, Start Num: 21

Candidate Starts for DoctorDiddles\_43:

(Start: 21 @34776 has 4 MA's), (25, 34761), (34, 34716), (40, 34698), (47, 34674), (79, 34515), (82, 34500), (95, 34377), (97, 34353), (103, 34320), (105, 34314), (114, 34245), (115, 34242),

Gene: Doug\_14 Start: 9472, Stop: 10032, Start Num: 22

Candidate Starts for Doug\_14:

(Start: 22 @9472 has 15 MA's), (Start: 30 @9493 has 14 MA's), (65, 9610), (67, 9622), (84, 9754), (98, 9877),

Gene: Drazdys\_220 Start: 125724, Stop: 126218, Start Num: 46

Candidate Starts for Drazdys\_220:

(11, 125523), (12, 125535), (13, 125544), (Start: 46 @125724 has 5 MA's), (90, 125982), (91, 125985), (102, 126078), (106, 126093), (114, 126159), (115, 126162),

Gene: EvePickles\_63 Start: 35612, Stop: 36130, Start Num: 44

Candidate Starts for EvePickles\_63:

(Start: 44 @35612 has 3 MA's), (53, 35642), (61, 35657), (75, 35768), (80, 35795), (88, 35861), (112, 36038), (115, 36062), (123, 36116),

Gene: Faja\_54 Start: 33652, Stop: 34113, Start Num: 58

Candidate Starts for Faja\_54:

(Start: 58 @33652 has 8 MA's), (79, 33784), (87, 33838), (106, 33991), (110, 34024),

Gene: Firecracker\_54 Start: 26311, Stop: 26910, Start Num: 22

Candidate Starts for Firecracker\_54:

(Start: 22 @26311 has 15 MA's), (27, 26326), (Start: 32 @26353 has 1 MA's), (36, 26371), (71, 26536), (80, 26599), (84, 26629), (89, 26683), (90, 26689), (91, 26692), (98, 26755), (103, 26779),

Gene: Firehouse51\_14 Start: 9532, Stop: 10071, Start Num: 30

Candidate Starts for Firehouse51\_14:

(Start: 30 @9532 has 14 MA's), (65, 9649), (67, 9661), (84, 9793), (97, 9907), (98, 9916),

Gene: Flabslab\_17 Start: 5449, Stop: 6036, Start Num: 21

Candidate Starts for Flabslab\_17:

(Start: 21 @5449 has 4 MA's), (25, 5464), (34, 5509), (40, 5527), (47, 5551), (79, 5710), (82, 5725), (95, 5848), (97, 5872), (103, 5905), (105, 5911), (114, 5980), (115, 5983),

Gene: Hestia\_76 Start: 44223, Stop: 44738, Start Num: 55

Candidate Starts for Hestia\_76:

(4, 43839), (10, 43917), (20, 44103), (Start: 55 @44223 has 2 MA's), (74, 44331), (81, 44373), (85, 44403), (86, 44406), (89, 44451), (99, 44538), (109, 44595), (114, 44634), (117, 44655),

Gene: Hestia\_48 Start: 30332, Stop: 30823, Start Num: 49

Candidate Starts for Hestia\_48:

(Start: 49 @30332 has 6 MA's), (78, 30479), (84, 30530), (92, 30608), (93, 30617), (100, 30668), (104, 30692), (105, 30695),

Gene: Hillester\_39 Start: 26218, Stop: 26697, Start Num: 51

Candidate Starts for Hillester\_39:

(Start: 41 @26194 has 1 MA's), (Start: 51 @26218 has 4 MA's), (77, 26356), (84, 26410), (108, 26602), (109, 26605),

Gene: Hillester\_57 Start: 33410, Stop: 33871, Start Num: 58

Candidate Starts for Hillester\_57:

(Start: 58 @33410 has 8 MA's), (79, 33542), (87, 33596), (106, 33749), (110, 33782),

Gene: Holt\_44 Start: 34891, Stop: 34304, Start Num: 21

Candidate Starts for Holt\_44:

(Start: 21 @34891 has 4 MA's), (25, 34876), (34, 34831), (40, 34813), (47, 34789), (79, 34630), (82, 34615), (95, 34492), (97, 34468), (103, 34435), (105, 34429), (114, 34360), (115, 34357),

Gene: Isolde\_80 Start: 46237, Stop: 46845, Start Num: 17

Candidate Starts for Isolde\_80:

(Start: 17 @46237 has 1 MA's), (Start: 23 @46264 has 1 MA's), (67, 46420), (76, 46501), (84, 46558), (88, 46594), (98, 46687), (109, 46753),

Gene: JalFarm20\_15 Start: 9339, Stop: 9878, Start Num: 30

Candidate Starts for JalFarm20\_15:

(Start: 22 @9318 has 15 MA's), (Start: 30 @9339 has 14 MA's), (65, 9456), (67, 9468), (84, 9600), (97, 9714), (98, 9723),

Gene: Jemmno\_221 Start: 124633, Stop: 125127, Start Num: 46

Candidate Starts for Jemmno\_221:

(11, 124432), (12, 124444), (13, 124453), (Start: 46 @124633 has 5 MA's), (90, 124891), (91, 124894), (102, 124987), (106, 125002), (114, 125068), (115, 125071),

Gene: Jinkies\_23 Start: 19784, Stop: 19203, Start Num: 24

Candidate Starts for Jinkies\_23:

(Start: 24 @19784 has 1 MA's), (45, 19700), (66, 19628), (78, 19538), (98, 19364), (106, 19325), (116, 19250),

Gene: Job42\_15 Start: 9341, Stop: 9901, Start Num: 22

Candidate Starts for Job42\_15:

(Start: 22 @9341 has 15 MA's), (Start: 30 @9362 has 14 MA's), (65, 9479), (67, 9491), (84, 9623), (97, 9737), (98, 9746),

Gene: Latretium\_14 Start: 9454, Stop: 10020, Start Num: 22

Candidate Starts for Latretium\_14:

(Start: 22 @9454 has 15 MA's), (29, 9472), (Start: 30 @9481 has 14 MA's), (65, 9598), (67, 9610), (84, 9742), (98, 9865),

Gene: Lawnathon\_82 Start: 46589, Stop: 47101, Start Num: 55

Candidate Starts for Lawnathon\_82:

(4, 46205), (10, 46283), (20, 46469), (Start: 55 @46589 has 2 MA's), (74, 46697), (81, 46739), (85, 46769), (86, 46772), (89, 46817), (99, 46904), (109, 46961), (114, 47000), (117, 47021),

Gene: MidnightRain\_47 Start: 30287, Stop: 29718, Start Num: 23

Candidate Starts for MidnightRain\_47:

(Start: 23 @30287 has 1 MA's), (37, 30221), (67, 30149), (72, 30089), (74, 30080), (81, 30038), (114, 29777),

Gene: MidnightRain\_57 Start: 33591, Stop: 34052, Start Num: 58

Candidate Starts for MidnightRain\_57:

(Start: 58 @33591 has 8 MA's), (79, 33723), (87, 33777), (106, 33930), (110, 33963),

Gene: Minnie\_14 Start: 9482, Stop: 10042, Start Num: 22

Candidate Starts for Minnie\_14:

(Start: 22 @9482 has 15 MA's), (Start: 30 @9503 has 14 MA's), (65, 9620), (67, 9632), (84, 9764), (97, 9878), (98, 9887),

Gene: Moonbeam\_14 Start: 9494, Stop: 10033, Start Num: 30

Candidate Starts for Moonbeam\_14:

(Start: 30 @9494 has 14 MA's), (65, 9611), (67, 9623), (84, 9755), (97, 9869), (98, 9878),

Gene: Mori\_53 Start: 26286, Stop: 26885, Start Num: 22

Candidate Starts for Mori\_53:

(Start: 22 @26286 has 15 MA's), (27, 26301), (71, 26511), (80, 26574), (84, 26604), (89, 26658), (90, 26664), (91, 26667), (98, 26730), (103, 26754),

Gene: Murai\_54 Start: 26476, Stop: 27075, Start Num: 22

Candidate Starts for Murai\_54:

(Start: 22 @26476 has 15 MA's), (27, 26491), (71, 26701), (80, 26764), (84, 26794), (89, 26848), (90, 26854), (91, 26857), (98, 26920), (103, 26944),

Gene: Myrna\_250 Start: 152417, Stop: 152881, Start Num: 42

Candidate Starts for Myrna\_250:

(Start: 42 @152417 has 1 MA's), (43, 152420), (56, 152456), (Start: 58 @152459 has 8 MA's), (62, 152471), (68, 152507), (69, 152525), (81, 152612), (86, 152645), (89, 152690), (90, 152696), (98, 152747), (107, 152792), (113, 152849),

Gene: Nappy\_90 Start: 35968, Stop: 36438, Start Num: 59

Candidate Starts for Nappy\_90:

(14, 35779), (18, 35833), (Start: 31 @35890 has 1 MA's), (37, 35917), (38, 35920), (52, 35953), (Start: 59 @35968 has 3 MA's), (76, 36082), (81, 36112), (82, 36115), (84, 36139), (96, 36241), (98, 36271), (106, 36310), (109, 36337), (111, 36349), (120, 36424), (122, 36427),

Gene: Nappy\_223 Start: 126433, Stop: 126927, Start Num: 46

Candidate Starts for Nappy\_223:

(11, 126232), (12, 126244), (13, 126253), (Start: 46 @126433 has 5 MA's), (90, 126691), (91, 126694), (102, 126787), (106, 126802), (114, 126868), (115, 126871),

Gene: OwlsT2W\_15 Start: 9352, Stop: 9891, Start Num: 30

Candidate Starts for OwlsT2W\_15:

(Start: 22 @9331 has 15 MA's), (Start: 30 @9352 has 14 MA's), (65, 9469), (67, 9481), (84, 9613), (97, 9727), (98, 9736),

Gene: Persistence\_41 Start: 28068, Stop: 28532, Start Num: 54

Candidate Starts for Persistence\_41:

(Start: 54 @28068 has 1 MA's), (73, 28164), (84, 28236), (88, 28272), (91, 28296), (97, 28359), (101, 28386),

Gene: Persistence\_49 Start: 31206, Stop: 31667, Start Num: 58

Candidate Starts for Persistence\_49:

(7, 30876), (8, 30882), (9, 30888), (Start: 58 @31206 has 8 MA's), (87, 31392), (106, 31545), (110, 31578),

Gene: Persistence\_67 Start: 37115, Stop: 37588, Start Num: 59

Candidate Starts for Persistence\_67:

(Start: 59 @37115 has 3 MA's), (72, 37217), (76, 37241), (79, 37256), (97, 37415), (106, 37463), (115, 37532), (120, 37577),

Gene: Persistence\_34 Start: 24603, Stop: 25106, Start Num: 41

Candidate Starts for Persistence\_34:

(26, 24537), (Start: 41 @24603 has 1 MA's), (Start: 51 @24627 has 4 MA's), (76, 24762), (77, 24765), (84, 24819), (91, 24879), (114, 25053),

Gene: Peterson\_6 Start: 3021, Stop: 3500, Start Num: 49

Candidate Starts for Peterson\_6:

(Start: 49 @3021 has 6 MA's), (79, 3180), (81, 3192), (87, 3234),

Gene: Phasih\_14 Start: 9525, Stop: 10064, Start Num: 30

Candidate Starts for Phasih\_14:

(Start: 22 @9504 has 15 MA's), (Start: 30 @9525 has 14 MA's), (65, 9642), (67, 9654), (84, 9786), (97, 9900), (98, 9909),

Gene: Phatniss\_14 Start: 9487, Stop: 10026, Start Num: 30

Candidate Starts for Phatniss\_14:

(Start: 30 @9487 has 14 MA's), (65, 9604), (67, 9616), (84, 9748), (97, 9862), (98, 9871),

Gene: Phrank15\_38 Start: 25579, Stop: 26058, Start Num: 51

Candidate Starts for Phrank15\_38:

(26, 25489), (Start: 41 @25555 has 1 MA's), (Start: 51 @25579 has 4 MA's), (84, 25771), (89, 25822), (91, 25831),

Gene: Phrank15\_56 Start: 32976, Stop: 33476, Start Num: 44

Candidate Starts for Phrank15\_56:

(2, 32526), (5, 32664), (Start: 44 @32976 has 3 MA's), (63, 33024), (86, 33189), (106, 33351),

Gene: Pitbull\_27 Start: 21048, Stop: 21602, Start Num: 33

Candidate Starts for Pitbull\_27:

(Start: 33 @21048 has 1 MA's), (83, 21300), (84, 21312), (89, 21363), (106, 21480), (112, 21525),

Gene: Polka14\_14 Start: 9487, Stop: 10026, Start Num: 30

Candidate Starts for Polka14\_14:

(Start: 22 @9466 has 15 MA's), (Start: 30 @9487 has 14 MA's), (65, 9604), (67, 9616), (84, 9748), (97, 9862), (98, 9871),

Gene: RadFad\_57 Start: 33410, Stop: 33871, Start Num: 58

Candidate Starts for RadFad\_57:

(Start: 58 @33410 has 8 MA's), (79, 33542), (87, 33596), (106, 33749), (110, 33782),

Gene: RadFad\_39 Start: 26218, Stop: 26697, Start Num: 51

Candidate Starts for RadFad\_39:

(Start: 41 @26194 has 1 MA's), (Start: 51 @26218 has 4 MA's), (77, 26356), (84, 26410), (108, 26602), (109, 26605),

Gene: Raqqa\_97 Start: 52473, Stop: 52976, Start Num: 51

Candidate Starts for Raqqa\_97:

(Start: 51 @52473 has 4 MA's), (70, 52554), (81, 52638), (84, 52665), (87, 52680), (88, 52701), (89, 52716), (94, 52755), (114, 52896), (116, 52905), (121, 52944),

Gene: Raqqa\_45 Start: 29275, Stop: 29736, Start Num: 58

Candidate Starts for Raqqa\_45:

(Start: 58 @29275 has 8 MA's), (79, 29407), (87, 29461), (106, 29614), (110, 29647),

Gene: Raqqa\_48 Start: 30332, Stop: 30787, Start Num: 64

Candidate Starts for Raqqa\_48:

(Start: 49 @30296 has 6 MA's), (64, 30332), (78, 30443), (84, 30494), (88, 30530), (92, 30572), (104, 30656),

Gene: Rialto\_15 Start: 9346, Stop: 9885, Start Num: 30

Candidate Starts for Rialto\_15:

(Start: 30 @9346 has 14 MA's), (65, 9463), (67, 9475), (84, 9607), (97, 9721), (98, 9730),

Gene: Richie\_96 Start: 52435, Stop: 52971, Start Num: 35

Candidate Starts for Richie\_96:

(6, 52150), (Start: 35 @52435 has 1 MA's), (Start: 41 @52456 has 1 MA's), (50, 52480), (81, 52651), (82, 52654), (97, 52798), (116, 52921),

Gene: Sandalphon\_14 Start: 9504, Stop: 10043, Start Num: 30

Candidate Starts for Sandalphon\_14:

(Start: 30 @9504 has 14 MA's), (65, 9621), (67, 9633), (84, 9765), (97, 9879), (98, 9888),

Gene: Sarge\_50 Start: 29604, Stop: 30206, Start Num: 19

Candidate Starts for Sarge\_50:

(Start: 19 @29604 has 1 MA's), (39, 29688), (48, 29715), (61, 29742), (67, 29772), (79, 29868), (84, 29907),

Gene: Sarge\_34 Start: 24292, Stop: 24756, Start Num: 58

Candidate Starts for Sarge\_34:

(Start: 58 @24292 has 8 MA's), (81, 24436), (118, 24733),

Gene: ShiaLabeouf\_219 Start: 124687, Stop: 125181, Start Num: 46

Candidate Starts for ShiaLabeouf\_219:

(11, 124486), (12, 124498), (13, 124507), (Start: 46 @124687 has 5 MA's), (90, 124945), (91, 124948), (102, 125041), (106, 125056), (114, 125122), (115, 125125),

Gene: Sisko\_10 Start: 10106, Stop: 9555, Start Num: 31

Candidate Starts for Sisko\_10:

(Start: 31 @10106 has 1 MA's), (60, 10022), (67, 9992), (72, 9926), (86, 9839), (88, 9806), (91, 9782), (97, 9722), (114, 9608),

Gene: Smooch\_56 Start: 27829, Stop: 28428, Start Num: 22

Candidate Starts for Smooch\_56:

(Start: 22 @27829 has 15 MA's), (27, 27844), (71, 28054), (80, 28117), (84, 28147), (89, 28201), (90, 28207), (91, 28210), (98, 28273), (103, 28297),

Gene: SpicyFrank\_59 Start: 33886, Stop: 34386, Start Num: 44

Candidate Starts for SpicyFrank\_59:

(Start: 44 @33886 has 3 MA's), (63, 33934), (82, 34069), (86, 34099), (106, 34261),

Gene: Sunshine924\_65 Start: 41214, Stop: 40627, Start Num: 21

Candidate Starts for Sunshine924\_65:

(Start: 21 @41214 has 4 MA's), (25, 41199), (34, 41154), (40, 41136), (47, 41112), (79, 40953), (82, 40938), (95, 40815), (97, 40791), (103, 40758), (105, 40752), (114, 40683), (115, 40680),

Gene: SuperGrey\_14 Start: 9478, Stop: 10038, Start Num: 22

Candidate Starts for SuperGrey\_14:

(Start: 22 @9478 has 15 MA's), (Start: 30 @9499 has 14 MA's), (65, 9616), (67, 9628), (84, 9760), (97, 9874), (98, 9883),

Gene: Tiff81\_46 Start: 27360, Stop: 27824, Start Num: 54

Candidate Starts for Tiff81\_46:

(Start: 54 @27360 has 1 MA's), (84, 27528), (88, 27564), (91, 27588), (97, 27651), (101, 27678),

Gene: Tripl3t\_5 Start: 2428, Stop: 2907, Start Num: 49

Candidate Starts for Tripl3t\_5:

(Start: 49 @2428 has 6 MA's), (79, 2587), (81, 2599), (87, 2641),

Gene: Trouble\_4 Start: 2065, Stop: 2544, Start Num: 49

Candidate Starts for Trouble\_4:

(Start: 49 @2065 has 6 MA's), (79, 2224), (81, 2236), (87, 2278),

Gene: Vorrps\_53 Start: 26287, Stop: 26886, Start Num: 22

Candidate Starts for Vorrps\_53:

(Start: 22 @26287 has 15 MA's), (27, 26302), (71, 26512), (80, 26575), (84, 26605), (89, 26659), (90, 26665), (91, 26668), (98, 26731), (103, 26755),

Gene: Watermelon\_6 Start: 2607, Stop: 3086, Start Num: 49

Candidate Starts for Watermelon\_6:

(Start: 49 @2607 has 6 MA's), (79, 2766), (81, 2778), (87, 2820),

Gene: Wee\_14 Start: 9531, Stop: 10070, Start Num: 30

Candidate Starts for Wee\_14:

(Start: 30 @9531 has 14 MA's), (65, 9648), (67, 9660), (84, 9792), (97, 9906), (98, 9915),

Gene: YungJamal\_57 Start: 27006, Stop: 27605, Start Num: 22

Candidate Starts for YungJamal\_57:

(Start: 22 @27006 has 15 MA's), (27, 27021), (71, 27231), (80, 27294), (84, 27324), (89, 27378), (90, 27384), (91, 27387), (98, 27450), (103, 27474),

Gene: Zucker\_62 Start: 35518, Stop: 36036, Start Num: 44

Candidate Starts for Zucker\_62:

(Start: 44 @35518 has 3 MA's), (53, 35548), (75, 35674), (80, 35701), (84, 35731), (88, 35767), (90, 35788), (115, 35968), (123, 36022),