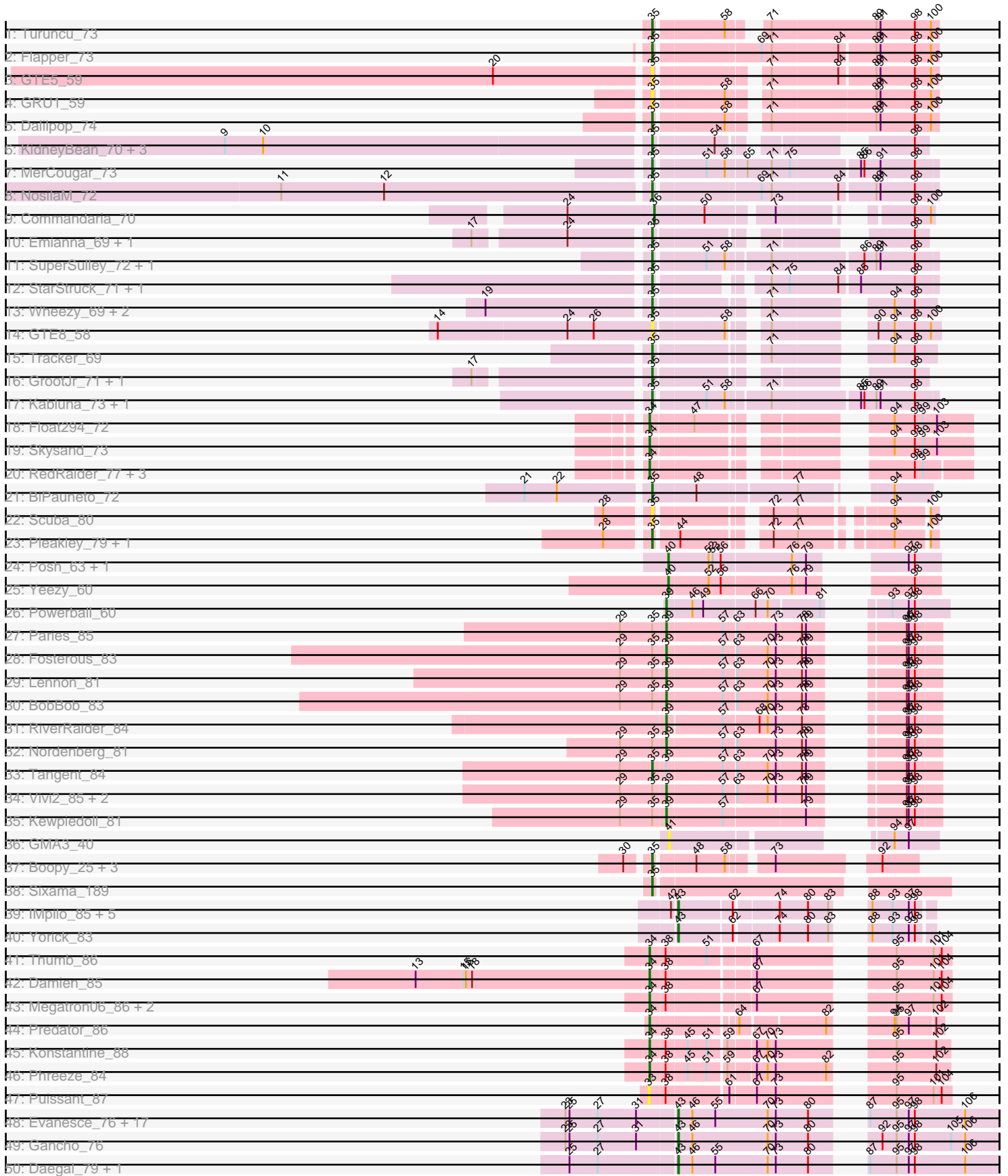


# Zoomed Pham 214171





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 214171 Report

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

Pham number 214171 has 97 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Turuncu\_73
- Track 2 : Flapper\_73
- Track 3 : GTE5\_59
- Track 4 : GRU1\_59
- Track 5 : Dalilpop\_74
- Track 6 : KidneyBean\_70, Phomeo\_70, Foxboro\_70, Jifall16\_69
- Track 7 : MerCougar\_73
- Track 8 : NosilaM\_72
- Track 9 : Commandaria\_70
- Track 10 : Emianna\_69, Kurt\_69
- Track 11 : SuperSulley\_72, Buggaboo\_72
- Track 12 : StarStruck\_71, Outis\_71
- Track 13 : Wheezy\_69, Arti\_68, NatB6\_69
- Track 14 : GTE8\_58
- Track 15 : Tracker\_69
- Track 16 : GrootJr\_71, NovumRegina\_69
- Track 17 : Kabluna\_73, Bonum\_74
- Track 18 : Float294\_72
- Track 19 : Skysand\_73
- Track 20 : RedRaider\_77, Lollipop1437\_74, Patio\_72, Ennea\_77
- Track 21 : BiPauneto\_72
- Track 22 : Scuba\_80
- Track 23 : Pleakley\_79, Fury\_79
- Track 24 : Posh\_63, Wrigley\_65
- Track 25 : Yeezy\_60
- Track 26 : Powerball\_60
- Track 27 : Paries\_85
- Track 28 : Fosterous\_83
- Track 29 : Lennon\_81
- Track 30 : BobBob\_83
- Track 31 : RiverRaider\_84
- Track 32 : Nordenberg\_81
- Track 33 : Tangent\_84
- Track 34 : Vivi2\_85, Rofo\_81, Charming\_84
- Track 35 : Kewpiedoll\_81
- Track 36 : GMA3\_40
- Track 37 : Boopy\_25, Mareelih\_23, BlueNGold\_23, Forza\_25

- Track 38 : Sixama\_189
- Track 39 : IMpilo\_85, Phalconet\_89, DaWorst\_90, JalFarm20\_98, Spikelee\_90, KingJulian\_87
- Track 40 : Yorick\_83
- Track 41 : Thumb\_86
- Track 42 : Damien\_85
- Track 43 : Megatron06\_86, Beckerton\_84, Oaker\_85
- Track 44 : Predator\_86
- Track 45 : Konstantine\_88
- Track 46 : Phreeze\_84
- Track 47 : Puissant\_87
- Track 48 : Evanesce\_76, Amymech\_77, Ein37\_77, Hadrien\_74, Kinbote\_75, Luna22\_70, Webster2\_77, OBUpride\_76, Luke\_74, LilHazelNut\_77, Giles\_70, Forge\_70, Dewey\_70, Ubuntu\_77, Hail\_70, DeepSoil15\_77, HH92\_76, Wishmaker\_70
- Track 49 : Gancho\_76
- Track 50 : Daegal\_79, Amochick\_78
- Track 51 : Gravaillia\_71
- Track 52 : Mbo2\_65

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

The start number called the most often in the published annotations is 35, it was called in 31 of the 86 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Arti\_68, BiPauneto\_72, BlueNGold\_23, Bonum\_74, Boopy\_25, Buggaboo\_72, Dalilpop\_74, Emianna\_69, Flapper\_73, Forza\_25, Foxboro\_70, Fury\_79, GRU1\_59, GTE5\_59, GTE8\_58, GrootJr\_71, Jifall16\_69, Kabluna\_73, KidneyBean\_70, Kurt\_69, Mareelih\_23, MerCougar\_73, NatB6\_69, NosilaM\_72, NovumRegina\_69, Outis\_71, Phomeo\_70, Pleakley\_79, Scuba\_80, Sixama\_189, StarStruck\_71, SuperSulley\_72, Tangent\_84, Tracker\_69, Turuncu\_73, Wheezy\_69,

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

- BobBob\_83, Charming\_84, Fosterous\_83, Kewpiedoll\_81, Lennon\_81, Nordenberg\_81, Paries\_85, Rofo\_81, Vivi2\_85,

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

- Amochick\_78, Amymech\_77, Beckerton\_84, Commandaria\_70, DaWorst\_90, Daegal\_79, Damien\_85, DeepSoil15\_77, Dewey\_70, Ein37\_77, Ennea\_77, Evanesce\_76, Float294\_72, Forge\_70, GMA3\_40, Gancho\_76, Giles\_70, Gravaillia\_71, HH92\_76, Hadrien\_74, Hail\_70, IMpilo\_85, JalFarm20\_98, Kinbote\_75, KingJulian\_87, Konstantine\_88, LilHazelNut\_77, Lollipop1437\_74, Luke\_74, Luna22\_70, Mbo2\_65, Megatron06\_86, OBUpride\_76, Oaker\_85, Patio\_72, Phalconet\_89, Phreeze\_84, Posh\_63, Powerball\_60, Predator\_86, Puissant\_87, RedRaider\_77, RiverRaider\_84, Skysand\_73, Spikelee\_90, Thumb\_86, Ubuntu\_77, Webster2\_77, Wishmaker\_70, Wrigley\_65, Yeezy\_60, Yorick\_83,

**Summary by start number:**

Start 33:

- Found in 1 of 97 ( 1.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Puissant\_87 (H1),

Start 34:

- Found in 15 of 97 ( 15.5% ) of genes in pham
- Manual Annotations of this start: 13 of 86
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Beckerton\_84 (H1), Damien\_85 (H1), Ennea\_77 (CR3), Float294\_72 (CR3), Konstantine\_88 (H1), Lollipop1437\_74 (CR3), Mbo2\_65 (singleton), Megatron06\_86 (H1), Oaker\_85 (H1), Patio\_72 (CR3), Phreeze\_84 (H1), Predator\_86 (H1), RedRaider\_77 (CR3), Skysand\_73 (CR3), Thumb\_86 (H1),

Start 35:

- Found in 45 of 97 ( 46.4% ) of genes in pham
- Manual Annotations of this start: 31 of 86
- Called 80.0% of time when present
- Phage (with cluster) where this start called: Arti\_68 (CR2), BiPauneto\_72 (CR4), BlueNGold\_23 (DS), Bonum\_74 (CR2), Boopy\_25 (DS), Buggaboo\_72 (CR2), Dalilpop\_74 (CR1), Emianna\_69 (CR2), Flapper\_73 (CR1), Forza\_25 (DS), Foxboro\_70 (CR2), Fury\_79 (CR5), GRU1\_59 (CR1), GTE5\_59 (CR1), GTE8\_58 (CR2), GrootJr\_71 (CR2), Jifall16\_69 (CR2), Kabluna\_73 (CR2), KidneyBean\_70 (CR2), Kurt\_69 (CR2), Mareelih\_23 (DS), MerCougar\_73 (CR2), NatB6\_69 (CR2), NosilaM\_72 (CR2), NovumRegina\_69 (CR2), Outis\_71 (CR2), Phomeo\_70 (CR2), Pleakley\_79 (CR5), Scuba\_80 (CR5), Sixama\_189 (DS), StarStruck\_71 (CR2), SuperSulley\_72 (CR2), Tangent\_84 (DE1), Tracker\_69 (CR2), Turuncu\_73 (CR1), Wheezy\_69 (CR2),

Start 36:

- Found in 1 of 97 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 86
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Commandaria\_70 (CR2),

Start 39:

- Found in 12 of 97 ( 12.4% ) of genes in pham
- Manual Annotations of this start: 11 of 86
- Called 91.7% of time when present
- Phage (with cluster) where this start called: BobBob\_83 (DE1), Charming\_84 (DE1), Fosterous\_83 (DE1), Kewpiedoll\_81 (DE1), Lennon\_81 (DE1), Nordenberg\_81 (DE1), Paries\_85 (DE1), Powerball\_60 (CZ4), RiverRaider\_84 (DE1), Rofo\_81 (DE1), Vivi2\_85 (DE1),

Start 40:

- Found in 3 of 97 ( 3.1% ) of genes in pham
- Manual Annotations of this start: 3 of 86
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Posh\_63 (CY), Wrigley\_65 (CY), Yeezy\_60 (CZ3),

Start 41:

- Found in 1 of 97 ( 1.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: GMA3\_40 (DF2),

Start 43:

- Found in 29 of 97 ( 29.9% ) of genes in pham
- Manual Annotations of this start: 27 of 86
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amochick\_78 (Q), Amymech\_77 (Q), DaWorst\_90 (F1), Daegal\_79 (Q), DeepSoil15\_77 (Q), Dewey\_70 (Q), Ein37\_77 (Q), Evanesce\_76 (Q), Forge\_70 (Q), Gancho\_76 (Q), Giles\_70 (Q), Gravaillia\_71 (Q), HH92\_76 (Q), Hadrien\_74 (Q), Hail\_70 (Q), IMpilo\_85 (F1), JalFarm20\_98 (F1), Kinbote\_75 (Q), KingJulian\_87 (F1), LilHazelnut\_77 (Q), Luke\_74 (Q), Luna22\_70 (Q), OBUpride\_76 (Q), Phalconet\_89 (F1), Spikelee\_90 (F1), Ubuntu\_77 (Q), Webster2\_77 (Q), Wishmaker\_70 (Q), Yorick\_83 (F1),

**Summary by clusters:**

There are 15 clusters represented in this pham: CR2, F1, singleton, CR1, CR4, CR3, DE1, H1, CZ4, DF2, Q, CY, CZ3, DS, CR5,

Info for manual annotations of cluster CR1:

- Start number 35 was manually annotated 3 times for cluster CR1.

Info for manual annotations of cluster CR2:

- Start number 35 was manually annotated 19 times for cluster CR2.
- Start number 36 was manually annotated 1 time for cluster CR2.

Info for manual annotations of cluster CR3:

- Start number 34 was manually annotated 5 times for cluster CR3.

Info for manual annotations of cluster CR4:

- Start number 35 was manually annotated 1 time for cluster CR4.

Info for manual annotations of cluster CR5:

- Start number 35 was manually annotated 2 times for cluster CR5.

Info for manual annotations of cluster CY:

- Start number 40 was manually annotated 2 times for cluster CY.

Info for manual annotations of cluster CZ3:

- Start number 40 was manually annotated 1 time for cluster CZ3.

Info for manual annotations of cluster CZ4:

- Start number 39 was manually annotated 1 time for cluster CZ4.

Info for manual annotations of cluster DE1:

- Start number 35 was manually annotated 1 time for cluster DE1.
- Start number 39 was manually annotated 10 times for cluster DE1.

Info for manual annotations of cluster DS:

•Start number 35 was manually annotated 5 times for cluster DS.

Info for manual annotations of cluster F1:

•Start number 43 was manually annotated 5 times for cluster F1.

Info for manual annotations of cluster H1:

•Start number 34 was manually annotated 8 times for cluster H1.

Info for manual annotations of cluster Q:

•Start number 43 was manually annotated 22 times for cluster Q.

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

Gene: Amochick\_78 Start: 50070, Stop: 50483, Start Num: 43

Candidate Starts for Amochick\_78:

(25, 49917), (27, 49959), (Start: 43 @50070 has 27 MA's), (46, 50091), (55, 50124), (70, 50199), (73, 50208), (80, 50256), (87, 50295), (95, 50334), (97, 50349), (98, 50358), (106, 50433),

Gene: Amymech\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Amymech\_77:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Arti\_68 Start: 52883, Stop: 52554, Start Num: 35

Candidate Starts for Arti\_68:

(19, 53114), (Start: 35 @52883 has 31 MA's), (71, 52751), (94, 52613), (98, 52586),

Gene: Beckerton\_84 Start: 62501, Stop: 62869, Start Num: 34

Candidate Starts for Beckerton\_84:

(Start: 34 @62501 has 13 MA's), (38, 62522), (67, 62639), (95, 62792), (101, 62843), (104, 62855),

Gene: BiPauneto\_72 Start: 52489, Stop: 52160, Start Num: 35

Candidate Starts for BiPauneto\_72:

(21, 52663), (22, 52615), (Start: 35 @52489 has 31 MA's), (48, 52429), (77, 52297), (94, 52213),

Gene: BlueNGold\_23 Start: 8738, Stop: 8418, Start Num: 35

Candidate Starts for BlueNGold\_23:

(30, 8768), (Start: 35 @8738 has 31 MA's), (48, 8684), (58, 8645), (73, 8594), (92, 8468),

Gene: BobBob\_83 Start: 56507, Stop: 56824, Start Num: 39

Candidate Starts for BobBob\_83:

(29, 56441), (Start: 35 @56489 has 31 MA's), (Start: 39 @56507 has 11 MA's), (57, 56585), (63, 56603), (70, 56648), (73, 56660), (78, 56696), (79, 56702), (96, 56777), (97, 56780), (98, 56789),

Gene: Bonum\_74 Start: 54210, Stop: 53830, Start Num: 35

Candidate Starts for Bonum\_74:

(Start: 35 @54210 has 31 MA's), (51, 54141), (58, 54117), (71, 54060), (85, 53937), (86, 53934), (89, 53916), (91, 53910), (98, 53862),

Gene: Boopy\_25 Start: 8750, Stop: 8430, Start Num: 35

Candidate Starts for Boopy\_25:

(30, 8780), (Start: 35 @8750 has 31 MA's), (48, 8696), (58, 8657), (73, 8606), (92, 8480),

Gene: Buggaboo\_72 Start: 54776, Stop: 54396, Start Num: 35

Candidate Starts for Buggaboo\_72:

(Start: 35 @54776 has 31 MA's), (51, 54707), (58, 54683), (71, 54626), (86, 54500), (89, 54482), (91, 54476), (98, 54428),

Gene: Charming\_84 Start: 55966, Stop: 56283, Start Num: 39

Candidate Starts for Charming\_84:

(29, 55900), (Start: 35 @55948 has 31 MA's), (Start: 39 @55966 has 11 MA's), (57, 56044), (63, 56062), (70, 56107), (73, 56119), (78, 56155), (79, 56161), (96, 56236), (97, 56239), (98, 56248),

Gene: Commandaria\_70 Start: 54164, Stop: 53838, Start Num: 36

Candidate Starts for Commandaria\_70:

(24, 54290), (Start: 36 @54164 has 1 MA's), (50, 54092), (73, 54008), (98, 53867), (100, 53843),

Gene: DaWorst\_90 Start: 50692, Stop: 50985, Start Num: 43

Candidate Starts for DaWorst\_90:

(42, 50686), (Start: 43 @50692 has 27 MA's), (62, 50767), (74, 50821), (80, 50860), (83, 50890), (88, 50902), (93, 50932), (97, 50953), (98, 50962),

Gene: Daegal\_79 Start: 50629, Stop: 51042, Start Num: 43

Candidate Starts for Daegal\_79:

(25, 50476), (27, 50518), (Start: 43 @50629 has 27 MA's), (46, 50650), (55, 50683), (70, 50758), (73, 50767), (80, 50815), (87, 50854), (95, 50893), (97, 50908), (98, 50917), (106, 50992),

Gene: Dalilpop\_74 Start: 55412, Stop: 55041, Start Num: 35

Candidate Starts for Dalilpop\_74:

(Start: 35 @55412 has 31 MA's), (58, 55319), (71, 55280), (89, 55130), (91, 55124), (98, 55076), (100, 55052),

Gene: Damien\_85 Start: 61997, Stop: 62365, Start Num: 34

Candidate Starts for Damien\_85:

(13, 61649), (15, 61721), (16, 61724), (18, 61733), (Start: 34 @61997 has 13 MA's), (38, 62018), (67, 62135), (95, 62288), (101, 62339), (104, 62351),

Gene: DeepSoil15\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for DeepSoil15\_77:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Dewey\_70 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Dewey\_70:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Ein37\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Ein37\_77:



(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Emianna\_69 Start: 54094, Stop: 53786, Start Num: 35  
Candidate Starts for Emianna\_69:  
(17, 54325), (24, 54205), (Start: 35 @54094 has 31 MA's), (98, 53806),

Gene: Ennea\_77 Start: 55526, Stop: 55152, Start Num: 34  
Candidate Starts for Ennea\_77:  
(Start: 34 @55526 has 13 MA's), (98, 55232), (99, 55220),

Gene: Evanesce\_76 Start: 49523, Stop: 49936, Start Num: 43  
Candidate Starts for Evanesce\_76:  
(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Flapper\_73 Start: 54630, Stop: 54241, Start Num: 35  
Candidate Starts for Flapper\_73:  
(Start: 35 @54630 has 31 MA's), (69, 54489), (71, 54474), (84, 54378), (89, 54330), (91, 54324), (98, 54276), (100, 54252),

Gene: Float294\_72 Start: 55429, Stop: 55049, Start Num: 34  
Candidate Starts for Float294\_72:  
(Start: 34 @55429 has 13 MA's), (47, 55369), (94, 55162), (98, 55135), (99, 55123), (103, 55102),

Gene: Forge\_70 Start: 49523, Stop: 49936, Start Num: 43  
Candidate Starts for Forge\_70:  
(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Forza\_25 Start: 8790, Stop: 8470, Start Num: 35  
Candidate Starts for Forza\_25:  
(30, 8820), (Start: 35 @8790 has 31 MA's), (48, 8736), (58, 8697), (73, 8646), (92, 8520),

Gene: Fosterous\_83 Start: 56959, Stop: 57276, Start Num: 39  
Candidate Starts for Fosterous\_83:  
(29, 56893), (Start: 35 @56941 has 31 MA's), (Start: 39 @56959 has 11 MA's), (57, 57037), (63, 57055), (70, 57100), (73, 57112), (78, 57148), (79, 57154), (96, 57229), (97, 57232), (98, 57241),

Gene: Foxboro\_70 Start: 54622, Stop: 54311, Start Num: 35  
Candidate Starts for Foxboro\_70:  
(9, 55240), (10, 55183), (Start: 35 @54622 has 31 MA's), (54, 54538), (98, 54331),

Gene: Fury\_79 Start: 53744, Stop: 53415, Start Num: 35  
Candidate Starts for Fury\_79:  
(28, 53798), (Start: 35 @53744 has 31 MA's), (44, 53714), (72, 53612), (77, 53579), (94, 53468), (100, 53426),

Gene: GMA3\_40 Start: 41542, Stop: 41240, Start Num: 41  
Candidate Starts for GMA3\_40:

(41, 41542), (94, 41305), (97, 41284),

Gene: GRU1\_59 Start: 46466, Stop: 46095, Start Num: 35

Candidate Starts for GRU1\_59:

(Start: 35 @46466 has 31 MA's), (58, 46373), (71, 46334), (89, 46184), (91, 46178), (98, 46130), (100, 46106),

Gene: GTE5\_59 Start: 47643, Stop: 47281, Start Num: 35

Candidate Starts for GTE5\_59:

(7, 48852), (8, 48621), (20, 47865), (Start: 35 @47643 has 31 MA's), (71, 47514), (84, 47418), (89, 47370), (91, 47364), (98, 47316), (100, 47292),

Gene: GTE8\_58 Start: 47388, Stop: 47053, Start Num: 35

Candidate Starts for GTE8\_58:

(14, 47703), (24, 47514), (26, 47475), (Start: 35 @47388 has 31 MA's), (58, 47292), (71, 47256), (90, 47142), (94, 47118), (98, 47091), (100, 47067),

Gene: Gancho\_76 Start: 49298, Stop: 49711, Start Num: 43

Candidate Starts for Gancho\_76:

(23, 49139), (25, 49145), (27, 49187), (31, 49244), (Start: 43 @49298 has 27 MA's), (46, 49319), (70, 49427), (73, 49436), (80, 49484), (92, 49541), (95, 49562), (97, 49577), (98, 49586), (105, 49640), (106, 49661),

Gene: Giles\_70 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Giles\_70:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Gravaillia\_71 Start: 49579, Stop: 49992, Start Num: 43

Candidate Starts for Gravaillia\_71:

(23, 49420), (25, 49426), (27, 49468), (31, 49525), (Start: 43 @49579 has 27 MA's), (46, 49600), (55, 49633), (70, 49708), (73, 49717), (80, 49765), (92, 49822), (95, 49843), (97, 49858), (98, 49867), (106, 49942),

Gene: GrootJr\_71 Start: 53488, Stop: 53180, Start Num: 35

Candidate Starts for GrootJr\_71:

(17, 53719), (Start: 35 @53488 has 31 MA's), (98, 53200),

Gene: HH92\_76 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for HH92\_76:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Hadrien\_74 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Hadrien\_74:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Hail\_70 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Hail\_70:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: IMpilo\_85 Start: 49064, Stop: 49357, Start Num: 43

Candidate Starts for IMpilo\_85:

(42, 49058), (Start: 43 @49064 has 27 MA's), (62, 49139), (74, 49193), (80, 49232), (83, 49262), (88, 49274), (93, 49304), (97, 49325), (98, 49334),

Gene: JalFarm20\_98 Start: 52287, Stop: 52580, Start Num: 43

Candidate Starts for JalFarm20\_98:

(42, 52281), (Start: 43 @52287 has 27 MA's), (62, 52362), (74, 52416), (80, 52455), (83, 52485), (88, 52497), (93, 52527), (97, 52548), (98, 52557),

Gene: Jifall16\_69 Start: 54115, Stop: 53807, Start Num: 35

Candidate Starts for Jifall16\_69:

(9, 54733), (10, 54676), (Start: 35 @54115 has 31 MA's), (54, 54031), (98, 53827),

Gene: Kabluna\_73 Start: 53539, Stop: 53159, Start Num: 35

Candidate Starts for Kabluna\_73:

(Start: 35 @53539 has 31 MA's), (51, 53470), (58, 53446), (71, 53389), (85, 53266), (86, 53263), (89, 53245), (91, 53239), (98, 53191),

Gene: Kewpiedoll\_81 Start: 57152, Stop: 57469, Start Num: 39

Candidate Starts for Kewpiedoll\_81:

(29, 57086), (Start: 35 @57134 has 31 MA's), (Start: 39 @57152 has 11 MA's), (57, 57230), (79, 57347), (96, 57422), (97, 57425), (98, 57434),

Gene: KidneyBean\_70 Start: 54239, Stop: 53931, Start Num: 35

Candidate Starts for KidneyBean\_70:

(9, 54857), (10, 54800), (Start: 35 @54239 has 31 MA's), (54, 54155), (98, 53951),

Gene: Kinbote\_75 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Kinbote\_75:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: KingJulian\_87 Start: 52334, Stop: 52627, Start Num: 43

Candidate Starts for KingJulian\_87:

(42, 52328), (Start: 43 @52334 has 27 MA's), (62, 52409), (74, 52463), (80, 52502), (83, 52532), (88, 52544), (93, 52574), (97, 52595), (98, 52604),

Gene: Konstantine\_88 Start: 62501, Stop: 62863, Start Num: 34

Candidate Starts for Konstantine\_88:

(Start: 34 @62501 has 13 MA's), (38, 62522), (45, 62552), (51, 62579), (59, 62603), (67, 62639), (70, 62654), (73, 62666), (95, 62792), (102, 62843),

Gene: Kurt\_69 Start: 54109, Stop: 53801, Start Num: 35

Candidate Starts for Kurt\_69:

(17, 54340), (24, 54220), (Start: 35 @54109 has 31 MA's), (98, 53821),

Gene: Lennon\_81 Start: 58019, Stop: 58336, Start Num: 39

Candidate Starts for Lennon\_81:

(29, 57953), (Start: 35 @58001 has 31 MA's), (Start: 39 @58019 has 11 MA's), (57, 58097), (63, 58115), (70, 58160), (73, 58172), (78, 58208), (79, 58214), (96, 58289), (97, 58292), (98, 58301),

Gene: LilHazelnut\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for LilHazelnut\_77:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Lollipop1437\_74 Start: 55206, Stop: 54832, Start Num: 34

Candidate Starts for Lollipop1437\_74:

(Start: 34 @55206 has 13 MA's), (98, 54912), (99, 54900),

Gene: Luke\_74 Start: 49478, Stop: 49891, Start Num: 43

Candidate Starts for Luke\_74:

(23, 49319), (25, 49325), (27, 49367), (31, 49424), (Start: 43 @49478 has 27 MA's), (46, 49499), (55, 49532), (70, 49607), (73, 49616), (80, 49664), (87, 49703), (95, 49742), (97, 49757), (98, 49766), (106, 49841),

Gene: Luna22\_70 Start: 49507, Stop: 49920, Start Num: 43

Candidate Starts for Luna22\_70:

(23, 49348), (25, 49354), (27, 49396), (31, 49453), (Start: 43 @49507 has 27 MA's), (46, 49528), (55, 49561), (70, 49636), (73, 49645), (80, 49693), (87, 49732), (95, 49771), (97, 49786), (98, 49795), (106, 49870),

Gene: Mareelih\_23 Start: 8195, Stop: 7875, Start Num: 35

Candidate Starts for Mareelih\_23:

(30, 8225), (Start: 35 @8195 has 31 MA's), (48, 8141), (58, 8102), (73, 8051), (92, 7925),

Gene: Mbo2\_65 Start: 49843, Stop: 49532, Start Num: 34

Candidate Starts for Mbo2\_65:

(32, 49846), (Start: 34 @49843 has 13 MA's), (37, 49834), (60, 49735), (77, 49642), (97, 49558),

Gene: Megatron06\_86 Start: 62582, Stop: 62950, Start Num: 34

Candidate Starts for Megatron06\_86:

(Start: 34 @62582 has 13 MA's), (38, 62603), (67, 62720), (95, 62873), (101, 62924), (104, 62936),

Gene: MerCougar\_73 Start: 55255, Stop: 54872, Start Num: 35

Candidate Starts for MerCougar\_73:

(Start: 35 @55255 has 31 MA's), (51, 55186), (58, 55162), (65, 55138), (71, 55102), (75, 55075), (85, 54979), (86, 54976), (91, 54952), (98, 54904),

Gene: NatB6\_69 Start: 53199, Stop: 52870, Start Num: 35

Candidate Starts for NatB6\_69:

(19, 53430), (Start: 35 @53199 has 31 MA's), (71, 53067), (94, 52929), (98, 52902),

Gene: Nordenberg\_81 Start: 55813, Stop: 56130, Start Num: 39

Candidate Starts for Nordenberg\_81:

(29, 55747), (Start: 35 @55795 has 31 MA's), (Start: 39 @55813 has 11 MA's), (57, 55891), (63, 55909), (73, 55966), (78, 56002), (79, 56008), (96, 56083), (97, 56086), (98, 56095),

Gene: NosilaM\_72 Start: 54191, Stop: 53805, Start Num: 35

Candidate Starts for NosilaM\_72:

(1, 55988), (2, 55640), (3, 55559), (4, 55523), (5, 55451), (6, 55448), (7, 55412), (8, 55181), (11, 54728), (12, 54575), (Start: 35 @54191 has 31 MA's), (69, 54050), (71, 54035), (84, 53939), (89, 53891), (91, 53885), (98, 53837),

Gene: NovumRegina\_69 Start: 53487, Stop: 53179, Start Num: 35

Candidate Starts for NovumRegina\_69:

(17, 53718), (Start: 35 @53487 has 31 MA's), (98, 53199),

Gene: OBUpride\_76 Start: 49567, Stop: 49980, Start Num: 43

Candidate Starts for OBUpride\_76:

(23, 49408), (25, 49414), (27, 49456), (31, 49513), (Start: 43 @49567 has 27 MA's), (46, 49588), (55, 49621), (70, 49696), (73, 49705), (80, 49753), (87, 49792), (95, 49831), (97, 49846), (98, 49855), (106, 49930),

Gene: Oaker\_85 Start: 62599, Stop: 62967, Start Num: 34

Candidate Starts for Oaker\_85:

(Start: 34 @62599 has 13 MA's), (38, 62620), (67, 62737), (95, 62890), (101, 62941), (104, 62953),

Gene: Outis\_71 Start: 54347, Stop: 53991, Start Num: 35

Candidate Starts for Outis\_71:

(Start: 35 @54347 has 31 MA's), (71, 54221), (75, 54194), (84, 54125), (85, 54098), (98, 54023),

Gene: Paries\_85 Start: 58101, Stop: 58418, Start Num: 39

Candidate Starts for Paries\_85:

(29, 58035), (Start: 35 @58083 has 31 MA's), (Start: 39 @58101 has 11 MA's), (57, 58179), (63, 58197), (73, 58254), (78, 58290), (79, 58296), (96, 58371), (97, 58374), (98, 58383),

Gene: Patio\_72 Start: 54263, Stop: 53889, Start Num: 34

Candidate Starts for Patio\_72:

(Start: 34 @54263 has 13 MA's), (98, 53969), (99, 53957),

Gene: Phalconet\_89 Start: 50694, Stop: 50987, Start Num: 43

Candidate Starts for Phalconet\_89:

(42, 50688), (Start: 43 @50694 has 27 MA's), (62, 50769), (74, 50823), (80, 50862), (83, 50892), (88, 50904), (93, 50934), (97, 50955), (98, 50964),

Gene: Phomeo\_70 Start: 54111, Stop: 53803, Start Num: 35

Candidate Starts for Phomeo\_70:

(9, 54729), (10, 54672), (Start: 35 @54111 has 31 MA's), (54, 54027), (98, 53823),

Gene: Phreeze\_84 Start: 61531, Stop: 61893, Start Num: 34

Candidate Starts for Phreeze\_84:

(Start: 34 @61531 has 13 MA's), (38, 61552), (45, 61582), (51, 61609), (59, 61633), (67, 61669), (70, 61684), (73, 61696), (82, 61771), (95, 61822), (102, 61873),

Gene: Pleakley\_79 Start: 53745, Stop: 53416, Start Num: 35

Candidate Starts for Pleakley\_79:

(28, 53799), (Start: 35 @53745 has 31 MA's), (44, 53715), (72, 53613), (77, 53580), (94, 53469), (100, 53427),

Gene: Posh\_63 Start: 44207, Stop: 44524, Start Num: 40

Candidate Starts for Posh\_63:

(Start: 40 @44207 has 3 MA's), (52, 44267), (53, 44273), (56, 44285), (76, 44384), (79, 44402), (97, 44477), (98, 44486),

Gene: Powerball\_60 Start: 40758, Stop: 41087, Start Num: 39

Candidate Starts for Powerball\_60:

(Start: 39 @40758 has 11 MA's), (46, 40794), (49, 40809), (66, 40881), (70, 40899), (81, 40971), (93, 41007), (97, 41028), (98, 41037),

Gene: Predator\_86 Start: 63141, Stop: 63479, Start Num: 34

Candidate Starts for Predator\_86:

(Start: 34 @63141 has 13 MA's), (64, 63252), (82, 63366), (94, 63414), (95, 63417), (97, 63432), (102, 63468),

Gene: Puissant\_87 Start: 62176, Stop: 62547, Start Num: 33

Candidate Starts for Puissant\_87:

(33, 62176), (38, 62197), (61, 62281), (67, 62317), (73, 62344), (95, 62470), (101, 62521), (104, 62533),

Gene: RedRaider\_77 Start: 56564, Stop: 56193, Start Num: 34

Candidate Starts for RedRaider\_77:

(Start: 34 @56564 has 13 MA's), (98, 56273), (99, 56261),

Gene: RiverRaider\_84 Start: 55160, Stop: 55474, Start Num: 39

Candidate Starts for RiverRaider\_84:

(Start: 39 @55160 has 11 MA's), (57, 55235), (68, 55286), (70, 55298), (73, 55310), (78, 55346), (96, 55427), (97, 55430), (98, 55439),

Gene: Rofo\_81 Start: 56542, Stop: 56859, Start Num: 39

Candidate Starts for Rofo\_81:

(29, 56476), (Start: 35 @56524 has 31 MA's), (Start: 39 @56542 has 11 MA's), (57, 56620), (63, 56638), (70, 56683), (73, 56695), (78, 56731), (79, 56737), (96, 56812), (97, 56815), (98, 56824),

Gene: Scuba\_80 Start: 53800, Stop: 53471, Start Num: 35

Candidate Starts for Scuba\_80:

(28, 53854), (Start: 35 @53800 has 31 MA's), (72, 53668), (77, 53635), (94, 53524), (100, 53482),

Gene: Sixama\_189 Start: 108945, Stop: 108553, Start Num: 35

Candidate Starts for Sixama\_189:

(Start: 35 @108945 has 31 MA's),

Gene: Skysand\_73 Start: 54926, Stop: 54546, Start Num: 34

Candidate Starts for Skysand\_73:

(Start: 34 @54926 has 13 MA's), (94, 54659), (98, 54632), (99, 54620), (103, 54599),

Gene: Spikelee\_90 Start: 52392, Stop: 52685, Start Num: 43

Candidate Starts for Spikelee\_90:

(42, 52386), (Start: 43 @52392 has 27 MA's), (62, 52467), (74, 52521), (80, 52560), (83, 52590), (88, 52602), (93, 52632), (97, 52653), (98, 52662),

Gene: StarStruck\_71 Start: 54347, Stop: 53991, Start Num: 35

Candidate Starts for StarStruck\_71:

(Start: 35 @54347 has 31 MA's), (71, 54221), (75, 54194), (84, 54125), (85, 54098), (98, 54023),

Gene: SuperSulley\_72 Start: 54776, Stop: 54396, Start Num: 35

Candidate Starts for SuperSulley\_72:

(Start: 35 @54776 has 31 MA's), (51, 54707), (58, 54683), (71, 54626), (86, 54500), (89, 54482), (91, 54476), (98, 54428),

Gene: Tangent\_84 Start: 56229, Stop: 56564, Start Num: 35

Candidate Starts for Tangent\_84:

(29, 56181), (Start: 35 @56229 has 31 MA's), (Start: 39 @56247 has 11 MA's), (57, 56325), (63, 56343), (70, 56388), (73, 56400), (78, 56436), (79, 56442), (96, 56517), (97, 56520), (98, 56529),

Gene: Thumb\_86 Start: 61951, Stop: 62319, Start Num: 34

Candidate Starts for Thumb\_86:

(Start: 34 @61951 has 13 MA's), (38, 61972), (51, 62029), (67, 62089), (95, 62242), (101, 62293), (104, 62305),

Gene: Tracker\_69 Start: 52943, Stop: 52614, Start Num: 35

Candidate Starts for Tracker\_69:

(Start: 35 @52943 has 31 MA's), (71, 52811), (94, 52673), (98, 52646),

Gene: Turuncu\_73 Start: 54452, Stop: 54084, Start Num: 35

Candidate Starts for Turuncu\_73:

(Start: 35 @54452 has 31 MA's), (58, 54359), (71, 54326), (89, 54173), (91, 54167), (98, 54119), (100, 54095),

Gene: Ubuntu\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Ubuntu\_77:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Vivi2\_85 Start: 57303, Stop: 57620, Start Num: 39

Candidate Starts for Vivi2\_85:

(29, 57237), (Start: 35 @57285 has 31 MA's), (Start: 39 @57303 has 11 MA's), (57, 57381), (63, 57399), (70, 57444), (73, 57456), (78, 57492), (79, 57498), (96, 57573), (97, 57576), (98, 57585),

Gene: Webster2\_77 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Webster2\_77:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Wheezy\_69 Start: 53157, Stop: 52828, Start Num: 35

Candidate Starts for Wheezy\_69:

(19, 53388), (Start: 35 @53157 has 31 MA's), (71, 53025), (94, 52887), (98, 52860),

Gene: Wishmaker\_70 Start: 49523, Stop: 49936, Start Num: 43

Candidate Starts for Wishmaker\_70:

(23, 49364), (25, 49370), (27, 49412), (31, 49469), (Start: 43 @49523 has 27 MA's), (46, 49544), (55, 49577), (70, 49652), (73, 49661), (80, 49709), (87, 49748), (95, 49787), (97, 49802), (98, 49811), (106, 49886),

Gene: Wrigley\_65 Start: 43790, Stop: 44107, Start Num: 40

Candidate Starts for Wrigley\_65:

(Start: 40 @43790 has 3 MA's), (52, 43850), (53, 43856), (56, 43868), (76, 43967), (79, 43985), (97, 44060), (98, 44069),

Gene: Yeezy\_60 Start: 40768, Stop: 41082, Start Num: 40

Candidate Starts for Yeezy\_60:

(Start: 40 @40768 has 3 MA's), (52, 40825), (56, 40843), (76, 40942), (79, 40960), (98, 41044),

Gene: Yorick\_83 Start: 51376, Stop: 51669, Start Num: 43

Candidate Starts for Yorick\_83:

(Start: 43 @51376 has 27 MA's), (62, 51451), (74, 51505), (80, 51544), (83, 51574), (88, 51586), (93, 51616), (97, 51637), (98, 51646),