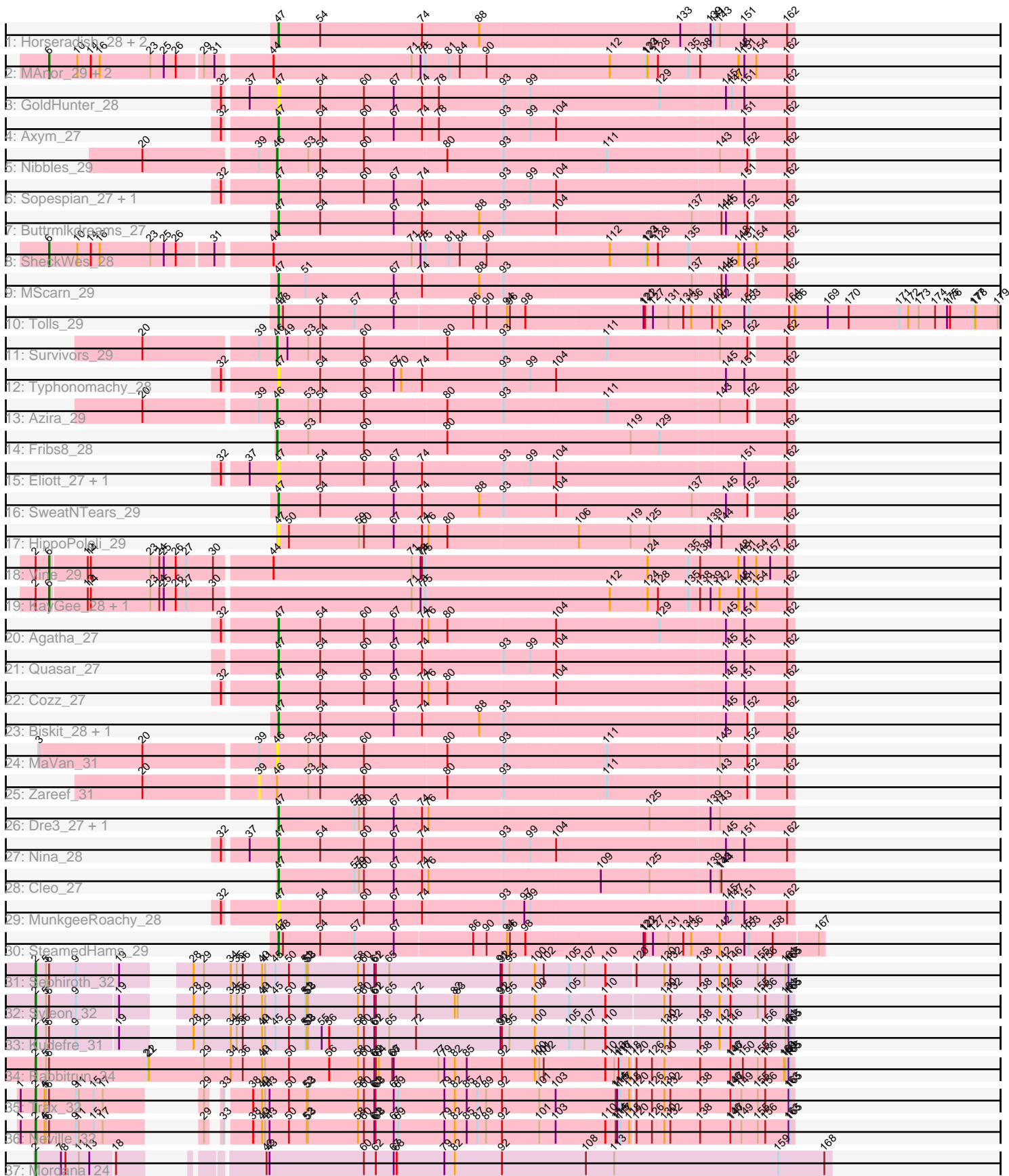


Pham 157972



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 157972 Report

This analysis was run 04/13/24 on database version 558.

Pham number 157972 has 46 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Horseradish\_28, Yummy\_28, Troje\_27
- Track 2 : MAnor\_29, Mayweather\_30, Pons\_29
- Track 3 : GoldHunter\_28
- Track 4 : Axym\_27
- Track 5 : Nibbles\_29
- Track 6 : Sopespian\_27, Burnsey\_27
- Track 7 : Buttrmlkdreams\_27
- Track 8 : SheckWes\_28
- Track 9 : MScarn\_29
- Track 10 : Tolls\_29
- Track 11 : Survivors\_29
- Track 12 : Typhonomachy\_28
- Track 13 : Azira\_29
- Track 14 : Fribs8\_28
- Track 15 : Elliott\_27, PsychoKiller\_27
- Track 16 : SweatNTears\_29
- Track 17 : HippoPololi\_29
- Track 18 : Vine\_29
- Track 19 : KayGee\_28, Elinal\_30
- Track 20 : Agatha\_27
- Track 21 : Quasar\_27
- Track 22 : Cozz\_27
- Track 23 : Biskit\_28, SketchMex\_26
- Track 24 : MaVan\_31
- Track 25 : Zareef\_31
- Track 26 : Dre3\_27, Gibbous\_27
- Track 27 : Nina\_28
- Track 28 : Cleo\_27
- Track 29 : MunkgeeRoachy\_28
- Track 30 : SteamedHams\_29
- Track 31 : Sephiroth\_32
- Track 32 : Syleon\_32
- Track 33 : Kudrefre\_31
- Track 34 : Rabbitrun\_34
- Track 35 : Trax\_32
- Track 36 : Neville\_32
- Track 37 : Morgana\_24

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

The start number called the most often in the published annotations is 47, it was called in 19 of the 35 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Agatha\_27, Axym\_27, Biskit\_28, Burnsey\_27, Buttrmlkdreams\_27, Cleo\_27, Cozz\_27, Dre3\_27, Elliott\_27, Gibbous\_27, GoldHunter\_28, HippoPololi\_29, Horseradish\_28, MScarn\_29, MunkgeeRoachy\_28, Nina\_28, PsychoKiller\_27, Quasar\_27, SketchMex\_26, Sopespian\_27, SteamedHams\_29, SweatNTears\_29, Tolls\_29, Troje\_27, Typhonmarchy\_28, Yummy\_28,

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

- 

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

- Azira\_29, Elinal\_30, Fribs8\_28, KayGee\_28, Kudefre\_31, MAnor\_29, MaVan\_31, Mayweather\_30, Morgana\_24, Neville\_32, Nibbles\_29, Pons\_29, Rabbitrun\_34, Sephiroth\_32, SheckWes\_28, Survivors\_29, Syleon\_32, Trax\_32, Vine\_29, Zareef\_31,

### **Summary by start number:**

Start 2:

- Found in 10 of 46 ( 21.7% ) of genes in pham
- Manual Annotations of this start: 7 of 35
- Called 70.0% of time when present
- Phage (with cluster) where this start called: Kudefre\_31 (DU1), Morgana\_24 (DZ), Neville\_32 (DU2), Rabbitrun\_34 (DU2), Sephiroth\_32 (DU1), Syleon\_32 (DU1), Trax\_32 (DU2),

Start 6:

- Found in 13 of 46 ( 28.3% ) of genes in pham
- Manual Annotations of this start: 5 of 35
- Called 53.8% of time when present
- Phage (with cluster) where this start called: Elinal\_30 (CT), KayGee\_28 (CT), MAnor\_29 (CT), Mayweather\_30 (CT), Pons\_29 (CT), SheckWes\_28 (CT), Vine\_29 (CT),

Start 39:

- Found in 5 of 46 ( 10.9% ) of genes in pham
- No Manual Annotations of this start.
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Zareef\_31 (CT),

Start 46:

- Found in 6 of 46 ( 13.0% ) of genes in pham
- Manual Annotations of this start: 4 of 35
- Called 83.3% of time when present

- Phage (with cluster) where this start called: Azira\_29 (CT), Fribs8\_28 (CT), MaVan\_31 (CT), Nibbles\_29 (CT), Survivors\_29 (CT),

Start 47:

- Found in 26 of 46 ( 56.5% ) of genes in pham
- Manual Annotations of this start: 19 of 35
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Agatha\_27 (CT), Axym\_27 (CT), Biskit\_28 (CT), Burnsey\_27 (CT), Buttrmlkdreams\_27 (CT), Cleo\_27 (CT), Cozz\_27 (CT), Dre3\_27 (CT), Elliott\_27 (CT), Gibbous\_27 (CT), GoldHunter\_28 (CT), HippoPololi\_29 (CT), Horseradish\_28 (CT), MScarn\_29 (CT), MunkgeeRoachy\_28 (CT), Nina\_28 (CT), PsychoKiller\_27 (CT), Quasar\_27 (CT), SketchMex\_26 (CT), Sopespian\_27 (CT), SteamedHams\_29 (CT), SweatNTears\_29 (CT), Tolls\_29 (CT), Troje\_27 (CT), Typhonmarchy\_28 (CT), Yummy\_28 (CT),

### Summary by clusters:

There are 4 clusters represented in this pham: DU1, DU2, DZ, CT,

Info for manual annotations of cluster CT:

- Start number 6 was manually annotated 5 times for cluster CT.
- Start number 46 was manually annotated 4 times for cluster CT.
- Start number 47 was manually annotated 19 times for cluster CT.

Info for manual annotations of cluster DU1:

- Start number 2 was manually annotated 3 times for cluster DU1.

Info for manual annotations of cluster DU2:

- Start number 2 was manually annotated 3 times for cluster DU2.

Info for manual annotations of cluster DZ:

- Start number 2 was manually annotated 1 time for cluster DZ.

### Gene Information:

Gene: Agatha\_27 Start: 21963, Stop: 22928, Start Num: 47

Candidate Starts for Agatha\_27:

(32, 21864), (Start: 47 @21963 has 19 MA's), (54, 22044), (60, 22128), (67, 22182), (74, 22239), (76, 22248), (80, 22284), (104, 22482), (129, 22677), (145, 22797), (151, 22830), (162, 22914),

Gene: Axym\_27 Start: 21966, Stop: 22931, Start Num: 47

Candidate Starts for Axym\_27:

(32, 21867), (Start: 47 @21966 has 19 MA's), (54, 22047), (60, 22131), (67, 22185), (74, 22242), (78, 22272), (93, 22395), (99, 22443), (104, 22485), (151, 22833), (162, 22917),

Gene: Azira\_29 Start: 22942, Stop: 23892, Start Num: 46

Candidate Starts for Azira\_29:

(20, 22687), (39, 22906), (Start: 46 @22942 has 4 MA's), (53, 22999), (54, 23023), (60, 23107), (80, 23263), (93, 23371), (111, 23557), (143, 23764), (152, 23815), (162, 23878),

Gene: Biskit\_28 Start: 21620, Stop: 22570, Start Num: 47

Candidate Starts for Biskit\_28:

(Start: 47 @21620 has 19 MA's), (54, 21701), (67, 21839), (74, 21896), (88, 22004), (93, 22049), (145, 22454), (152, 22493), (162, 22556),

Gene: Burnsey\_27 Start: 21967, Stop: 22923, Start Num: 47

Candidate Starts for Burnsey\_27:

(32, 21868), (Start: 47 @21967 has 19 MA's), (54, 22048), (60, 22132), (67, 22186), (74, 22234), (93, 22387), (99, 22435), (104, 22477), (151, 22825), (162, 22909),

Gene: Buttrmlkdreams\_27 Start: 21602, Stop: 22552, Start Num: 47

Candidate Starts for Buttrmlkdreams\_27:

(Start: 47 @21602 has 19 MA's), (54, 21683), (67, 21821), (74, 21878), (88, 21986), (93, 22031), (104, 22121), (137, 22379), (144, 22427), (145, 22436), (152, 22475), (162, 22538),

Gene: Cleo\_27 Start: 22293, Stop: 23258, Start Num: 47

Candidate Starts for Cleo\_27:

(Start: 47 @22293 has 19 MA's), (57, 22440), (59, 22449), (60, 22458), (67, 22512), (74, 22569), (76, 22578), (109, 22896), (125, 22989), (139, 23100), (143, 23115), (144, 23118),

Gene: Cozz\_27 Start: 21967, Stop: 22932, Start Num: 47

Candidate Starts for Cozz\_27:

(32, 21868), (Start: 47 @21967 has 19 MA's), (54, 22048), (60, 22132), (67, 22186), (74, 22243), (76, 22252), (80, 22288), (104, 22486), (145, 22801), (151, 22834), (162, 22918),

Gene: Dre3\_27 Start: 22219, Stop: 23184, Start Num: 47

Candidate Starts for Dre3\_27:

(Start: 47 @22219 has 19 MA's), (57, 22366), (59, 22375), (60, 22384), (67, 22438), (74, 22495), (76, 22504), (125, 22915), (139, 23026), (143, 23041),

Gene: Elinal\_30 Start: 22849, Stop: 24279, Start Num: 6

Candidate Starts for Elinal\_30:

(Start: 2 @22822 has 7 MA's), (Start: 6 @22849 has 5 MA's), (12, 22921), (14, 22924), (23, 23044), (24, 23062), (25, 23071), (26, 23095), (27, 23116), (30, 23170), (71, 23551), (73, 23569), (75, 23578), (112, 23929), (124, 24004), (128, 24025), (135, 24085), (138, 24103), (139, 24124), (142, 24142), (148, 24175), (151, 24187), (154, 24208), (162, 24268),

Gene: Elliott\_27 Start: 21966, Stop: 22931, Start Num: 47

Candidate Starts for Elliott\_27:

(32, 21867), (37, 21909), (Start: 47 @21966 has 19 MA's), (54, 22047), (60, 22131), (67, 22185), (74, 22242), (93, 22395), (99, 22443), (104, 22485), (151, 22833), (162, 22917),

Gene: Fribs8\_28 Start: 22797, Stop: 23762, Start Num: 46

Candidate Starts for Fribs8\_28:

(Start: 46 @22797 has 4 MA's), (53, 22854), (60, 22962), (80, 23118), (119, 23460), (129, 23511), (162, 23748),

Gene: Gibbous\_27 Start: 22219, Stop: 23184, Start Num: 47

Candidate Starts for Gibbous\_27:

(Start: 47 @22219 has 19 MA's), (57, 22366), (59, 22375), (60, 22384), (67, 22438), (74, 22495), (76, 22504), (125, 22915), (139, 23026), (143, 23041),

Gene: GoldHunter\_28 Start: 21967, Stop: 22932, Start Num: 47

Candidate Starts for GoldHunter\_28:

(32, 21868), (37, 21910), (Start: 47 @21967 has 19 MA's), (54, 22048), (60, 22132), (67, 22186), (74, 22243), (78, 22273), (93, 22396), (99, 22444), (129, 22681), (145, 22801), (147, 22813), (151, 22834), (162, 22918),

Gene: HippoPololi\_29 Start: 22868, Stop: 23833, Start Num: 47

Candidate Starts for HippoPololi\_29:

(Start: 47 @22868 has 19 MA's), (50, 22889), (59, 23024), (60, 23033), (67, 23087), (74, 23144), (76, 23153), (80, 23189), (106, 23429), (119, 23531), (125, 23564), (139, 23675), (144, 23693), (162, 23819),

Gene: Horseradish\_28 Start: 21441, Stop: 22406, Start Num: 47

Candidate Starts for Horseradish\_28:

(Start: 47 @21441 has 19 MA's), (54, 21522), (74, 21717), (88, 21825), (133, 22197), (139, 22248), (141, 22254), (143, 22263), (151, 22308), (162, 22392),

Gene: KayGee\_28 Start: 22849, Stop: 24279, Start Num: 6

Candidate Starts for KayGee\_28:

(Start: 2 @22822 has 7 MA's), (Start: 6 @22849 has 5 MA's), (12, 22921), (14, 22924), (23, 23044), (24, 23062), (25, 23071), (26, 23095), (27, 23116), (30, 23170), (71, 23551), (73, 23569), (75, 23578), (112, 23929), (124, 24004), (128, 24025), (135, 24085), (138, 24103), (139, 24124), (142, 24142), (148, 24175), (151, 24187), (154, 24208), (162, 24268),

Gene: Kudfre\_31 Start: 26003, Stop: 27445, Start Num: 2

Candidate Starts for Kudfre\_31:

(Start: 2 @26003 has 7 MA's), (5, 26024), (Start: 6 @26030 has 5 MA's), (9, 26084), (19, 26165), (28, 26258), (29, 26279), (34, 26333), (35, 26345), (36, 26357), (40, 26396), (41, 26402), (45, 26423), (50, 26450), (51, 26480), (52, 26483), (53, 26486), (55, 26513), (56, 26528), (58, 26585), (60, 26597), (61, 26618), (62, 26621), (65, 26648), (72, 26702), (91, 26870), (92, 26873), (95, 26888), (100, 26939), (105, 27008), (107, 27038), (110, 27077), (130, 27188), (132, 27200), (138, 27260), (142, 27299), (146, 27320), (156, 27389), (161, 27428), (163, 27434), (165, 27437),

Gene: MAnor\_29 Start: 22872, Stop: 24305, Start Num: 6

Candidate Starts for MAnor\_29:

(Start: 6 @22872 has 5 MA's), (10, 22929), (14, 22956), (16, 22974), (23, 23076), (25, 23103), (26, 23127), (29, 23175), (31, 23196), (44, 23301), (71, 23574), (73, 23592), (75, 23601), (81, 23646), (84, 23667), (90, 23718), (112, 23952), (123, 24024), (124, 24027), (128, 24048), (135, 24108), (138, 24126), (148, 24198), (151, 24210), (154, 24234), (162, 24294),

Gene: MScarn\_29 Start: 21605, Stop: 22555, Start Num: 47

Candidate Starts for MScarn\_29:

(Start: 47 @21605 has 19 MA's), (51, 21656), (67, 21824), (74, 21881), (88, 21989), (93, 22034), (137, 22382), (144, 22430), (145, 22439), (152, 22478), (162, 22541),

Gene: MaVan\_31 Start: 22975, Stop: 23925, Start Num: 46

Candidate Starts for MaVan\_31:

(3, 22513), (20, 22720), (39, 22939), (Start: 46 @22975 has 4 MA's), (53, 23032), (54, 23056), (60, 23140), (80, 23296), (93, 23404), (111, 23590), (143, 23797), (152, 23848), (162, 23911),

Gene: Mayweather\_30 Start: 23488, Stop: 24921, Start Num: 6

Candidate Starts for Mayweather\_30:

(Start: 6 @23488 has 5 MA's), (10, 23545), (14, 23572), (16, 23590), (23, 23692), (25, 23719), (26, 23743), (29, 23791), (31, 23812), (44, 23917), (71, 24190), (73, 24208), (75, 24217), (81, 24262), (84, 24283), (90, 24334), (112, 24568), (123, 24640), (124, 24643), (128, 24664), (135, 24724), (138,

24742), (148, 24814), (151, 24826), (154, 24850), (162, 24910),

Gene: Morgana\_24 Start: 21426, Stop: 22886, Start Num: 2

Candidate Starts for Morgana\_24:

(Start: 2 @21426 has 7 MA's), (7, 21477), (8, 21486), (11, 21513), (13, 21531), (18, 21579), (42, 21759), (43, 21765), (60, 21954), (62, 21978), (67, 22014), (68, 22020), (79, 22116), (82, 22137), (92, 22230), (108, 22398), (113, 22455), (159, 22779), (168, 22872),

Gene: MunkgeeRoachy\_28 Start: 22044, Stop: 23009, Start Num: 47

Candidate Starts for MunkgeeRoachy\_28:

(32, 21945), (Start: 47 @22044 has 19 MA's), (54, 22125), (60, 22209), (67, 22263), (74, 22320), (93, 22473), (97, 22512), (99, 22521), (145, 22878), (147, 22890), (151, 22911), (162, 22995),

Gene: Neville\_32 Start: 27410, Stop: 28765, Start Num: 2

Candidate Starts for Neville\_32:

(1, 27380), (Start: 2 @27410 has 7 MA's), (4, 27428), (5, 27431), (Start: 6 @27437 has 5 MA's), (9, 27491), (11, 27497), (15, 27527), (17, 27545), (29, 27638), (33, 27653), (38, 27698), (40, 27716), (41, 27722), (43, 27731), (50, 27770), (52, 27803), (53, 27806), (58, 27905), (60, 27917), (61, 27938), (62, 27941), (63, 27944), (67, 27977), (69, 27986), (79, 28079), (82, 28100), (85, 28124), (87, 28145), (89, 28163), (92, 28193), (101, 28268), (103, 28301), (110, 28397), (114, 28418), (115, 28421), (117, 28427), (118, 28445), (120, 28454), (126, 28484), (130, 28508), (132, 28520), (138, 28580), (146, 28640), (147, 28643), (149, 28661), (155, 28694), (156, 28709), (163, 28754), (165, 28757),

Gene: Nibbles\_29 Start: 22974, Stop: 23924, Start Num: 46

Candidate Starts for Nibbles\_29:

(20, 22719), (39, 22938), (Start: 46 @22974 has 4 MA's), (53, 23031), (54, 23055), (60, 23139), (80, 23295), (93, 23403), (111, 23589), (143, 23796), (152, 23847), (162, 23910),

Gene: Nina\_28 Start: 23006, Stop: 23971, Start Num: 47

Candidate Starts for Nina\_28:

(32, 22907), (37, 22949), (Start: 47 @23006 has 19 MA's), (54, 23087), (60, 23171), (67, 23225), (74, 23282), (93, 23435), (99, 23483), (104, 23525), (145, 23840), (151, 23873), (162, 23957),

Gene: Pons\_29 Start: 22861, Stop: 24294, Start Num: 6

Candidate Starts for Pons\_29:

(Start: 6 @22861 has 5 MA's), (10, 22918), (14, 22945), (16, 22963), (23, 23065), (25, 23092), (26, 23116), (29, 23164), (31, 23185), (44, 23290), (71, 23563), (73, 23581), (75, 23590), (81, 23635), (84, 23656), (90, 23707), (112, 23941), (123, 24013), (124, 24016), (128, 24037), (135, 24097), (138, 24115), (148, 24187), (151, 24199), (154, 24223), (162, 24283),

Gene: PsychoKiller\_27 Start: 21966, Stop: 22931, Start Num: 47

Candidate Starts for PsychoKiller\_27:

(32, 21867), (37, 21909), (Start: 47 @21966 has 19 MA's), (54, 22047), (60, 22131), (67, 22185), (74, 22242), (93, 22395), (99, 22443), (104, 22485), (151, 22833), (162, 22917),

Gene: Quasar\_27 Start: 22575, Stop: 23540, Start Num: 47

Candidate Starts for Quasar\_27:

(Start: 47 @22575 has 19 MA's), (54, 22656), (60, 22740), (67, 22794), (74, 22851), (93, 23004), (99, 23052), (104, 23094), (145, 23409), (151, 23442), (162, 23526),

Gene: Rabbitrun\_34 Start: 27724, Stop: 29229, Start Num: 2

Candidate Starts for Rabbitrun\_34:

(Start: 2 @27724 has 7 MA's), (5, 27745), (Start: 6 @27751 has 5 MA's), (21, 27949), (22, 27952), (29, 28063), (34, 28117), (36, 28141), (40, 28180), (41, 28186), (50, 28234), (56, 28312), (58, 28369), (60, 28381), (61, 28402), (62, 28405), (64, 28411), (66, 28438), (67, 28441), (77, 28531), (79, 28543), (82, 28564), (85, 28588), (92, 28657), (100, 28723), (101, 28732), (102, 28741), (110, 28861), (113, 28879), (116, 28888), (117, 28891), (118, 28909), (120, 28918), (126, 28948), (130, 28972), (138, 29044), (146, 29104), (147, 29107), (150, 29128), (155, 29158), (156, 29173), (160, 29209), (161, 29212), (163, 29218), (165, 29221),

Gene: Sephiroth\_32 Start: 26174, Stop: 27616, Start Num: 2

Candidate Starts for Sephiroth\_32:

(Start: 2 @26174 has 7 MA's), (5, 26195), (Start: 6 @26201 has 5 MA's), (9, 26255), (19, 26336), (28, 26429), (29, 26450), (34, 26504), (35, 26516), (36, 26528), (40, 26567), (41, 26573), (45, 26594), (50, 26621), (51, 26651), (52, 26654), (53, 26657), (58, 26756), (60, 26768), (61, 26789), (62, 26792), (65, 26819), (91, 27041), (92, 27044), (95, 27059), (100, 27110), (102, 27128), (105, 27179), (107, 27209), (110, 27248), (120, 27305), (130, 27359), (132, 27371), (138, 27431), (142, 27470), (146, 27491), (155, 27545), (156, 27560), (161, 27599), (163, 27605), (165, 27608),

Gene: SheckWes\_28 Start: 21838, Stop: 23271, Start Num: 6

Candidate Starts for SheckWes\_28:

(Start: 6 @21838 has 5 MA's), (10, 21895), (14, 21922), (16, 21940), (23, 22042), (25, 22069), (26, 22093), (31, 22162), (44, 22267), (71, 22540), (73, 22558), (75, 22567), (81, 22612), (84, 22633), (90, 22684), (112, 22918), (123, 22990), (124, 22993), (128, 23014), (135, 23074), (148, 23164), (151, 23176), (154, 23200), (162, 23260),

Gene: SketchMex\_26 Start: 21620, Stop: 22570, Start Num: 47

Candidate Starts for SketchMex\_26:

(Start: 47 @21620 has 19 MA's), (54, 21701), (67, 21839), (74, 21896), (88, 22004), (93, 22049), (145, 22454), (152, 22493), (162, 22556),

Gene: Sopespian\_27 Start: 21967, Stop: 22932, Start Num: 47

Candidate Starts for Sopespian\_27:

(32, 21868), (Start: 47 @21967 has 19 MA's), (54, 22048), (60, 22132), (67, 22186), (74, 22243), (93, 22396), (99, 22444), (104, 22486), (151, 22834), (162, 22918),

Gene: SteamedHams\_29 Start: 21624, Stop: 22667, Start Num: 47

Candidate Starts for SteamedHams\_29:

(Start: 47 @21624 has 19 MA's), (48, 21633), (54, 21705), (57, 21771), (67, 21843), (86, 21990), (90, 22017), (94, 22056), (96, 22062), (98, 22092), (121, 22317), (122, 22320), (127, 22335), (131, 22365), (134, 22395), (136, 22410), (142, 22467), (151, 22515), (153, 22524), (158, 22572), (167, 22656),

Gene: Survivors\_29 Start: 22791, Stop: 23741, Start Num: 46

Candidate Starts for Survivors\_29:

(20, 22536), (39, 22755), (Start: 46 @22791 has 4 MA's), (49, 22809), (53, 22848), (54, 22872), (60, 22956), (80, 23112), (93, 23220), (111, 23406), (143, 23613), (152, 23664), (162, 23727),

Gene: SweatNTears\_29 Start: 21888, Stop: 22838, Start Num: 47

Candidate Starts for SweatNTears\_29:

(Start: 47 @21888 has 19 MA's), (54, 21969), (67, 22107), (74, 22164), (88, 22272), (93, 22317), (104, 22407), (137, 22665), (145, 22722), (152, 22761), (162, 22824),

Gene: Syleon\_32 Start: 26096, Stop: 27538, Start Num: 2

Candidate Starts for Syleon\_32:



(Start: 2 @26096 has 7 MA's), (5, 26117), (Start: 6 @26123 has 5 MA's), (9, 26177), (19, 26258), (28, 26351), (29, 26372), (34, 26426), (35, 26438), (36, 26450), (40, 26489), (41, 26495), (45, 26516), (50, 26543), (51, 26573), (52, 26576), (53, 26579), (58, 26678), (60, 26690), (61, 26711), (62, 26714), (65, 26741), (72, 26795), (82, 26873), (83, 26879), (91, 26963), (92, 26966), (95, 26981), (100, 27032), (105, 27101), (110, 27170), (130, 27281), (132, 27293), (138, 27353), (142, 27392), (146, 27413), (155, 27467), (156, 27482), (161, 27521), (163, 27527), (165, 27530),

Gene: Tolls\_29 Start: 21618, Stop: 23021, Start Num: 47

Candidate Starts for Tolls\_29:

(Start: 47 @21618 has 19 MA's), (48, 21627), (54, 21699), (57, 21765), (67, 21837), (86, 21984), (90, 22011), (94, 22050), (96, 22056), (98, 22086), (121, 22311), (122, 22314), (127, 22329), (131, 22359), (134, 22389), (136, 22404), (140, 22446), (142, 22461), (151, 22509), (153, 22518), (164, 22596), (166, 22608), (169, 22674), (170, 22716), (171, 22818), (172, 22836), (173, 22857), (174, 22890), (175, 22914), (176, 22920), (177, 22968), (178, 22971), (179, 23016),

Gene: Trax\_32 Start: 27716, Stop: 29071, Start Num: 2

Candidate Starts for Trax\_32:

(1, 27686), (Start: 2 @27716 has 7 MA's), (4, 27734), (5, 27737), (Start: 6 @27743 has 5 MA's), (9, 27797), (11, 27803), (15, 27833), (17, 27851), (29, 27944), (33, 27959), (38, 28004), (40, 28022), (41, 28028), (43, 28037), (50, 28076), (52, 28109), (53, 28112), (58, 28211), (60, 28223), (61, 28244), (62, 28247), (63, 28250), (67, 28283), (69, 28292), (79, 28385), (82, 28406), (85, 28430), (87, 28451), (89, 28469), (92, 28499), (101, 28574), (103, 28607), (114, 28724), (115, 28727), (117, 28733), (118, 28751), (120, 28760), (126, 28790), (130, 28814), (132, 28826), (138, 28886), (146, 28946), (147, 28949), (149, 28967), (155, 29000), (156, 29015), (163, 29060), (165, 29063),

Gene: Troje\_27 Start: 21602, Stop: 22567, Start Num: 47

Candidate Starts for Troje\_27:

(Start: 47 @21602 has 19 MA's), (54, 21683), (74, 21878), (88, 21986), (133, 22358), (139, 22409), (141, 22415), (143, 22424), (151, 22469), (162, 22553),

Gene: Typhonomachy\_28 Start: 21999, Stop: 22964, Start Num: 47

Candidate Starts for Typhonomachy\_28:

(32, 21900), (Start: 47 @21999 has 19 MA's), (54, 22080), (60, 22164), (67, 22218), (70, 22233), (74, 22275), (93, 22428), (99, 22476), (104, 22518), (145, 22833), (151, 22866), (162, 22950),

Gene: Vine\_29 Start: 22832, Stop: 24265, Start Num: 6

Candidate Starts for Vine\_29:

(Start: 2 @22805 has 7 MA's), (Start: 6 @22832 has 5 MA's), (12, 22904), (14, 22907), (23, 23027), (24, 23045), (25, 23054), (26, 23078), (27, 23099), (30, 23153), (44, 23261), (71, 23534), (73, 23552), (74, 23555), (75, 23561), (124, 23987), (135, 24068), (138, 24086), (148, 24158), (151, 24170), (154, 24194), (157, 24221), (162, 24254),

Gene: Yummy\_28 Start: 21555, Stop: 22520, Start Num: 47

Candidate Starts for Yummy\_28:

(Start: 47 @21555 has 19 MA's), (54, 21636), (74, 21831), (88, 21939), (133, 22311), (139, 22362), (141, 22368), (143, 22377), (151, 22422), (162, 22506),

Gene: Zareef\_31 Start: 22907, Stop: 23893, Start Num: 39

Candidate Starts for Zareef\_31:

(20, 22688), (39, 22907), (Start: 46 @22943 has 4 MA's), (53, 23000), (54, 23024), (60, 23108), (80, 23264), (93, 23372), (111, 23558), (143, 23765), (152, 23816), (162, 23879),