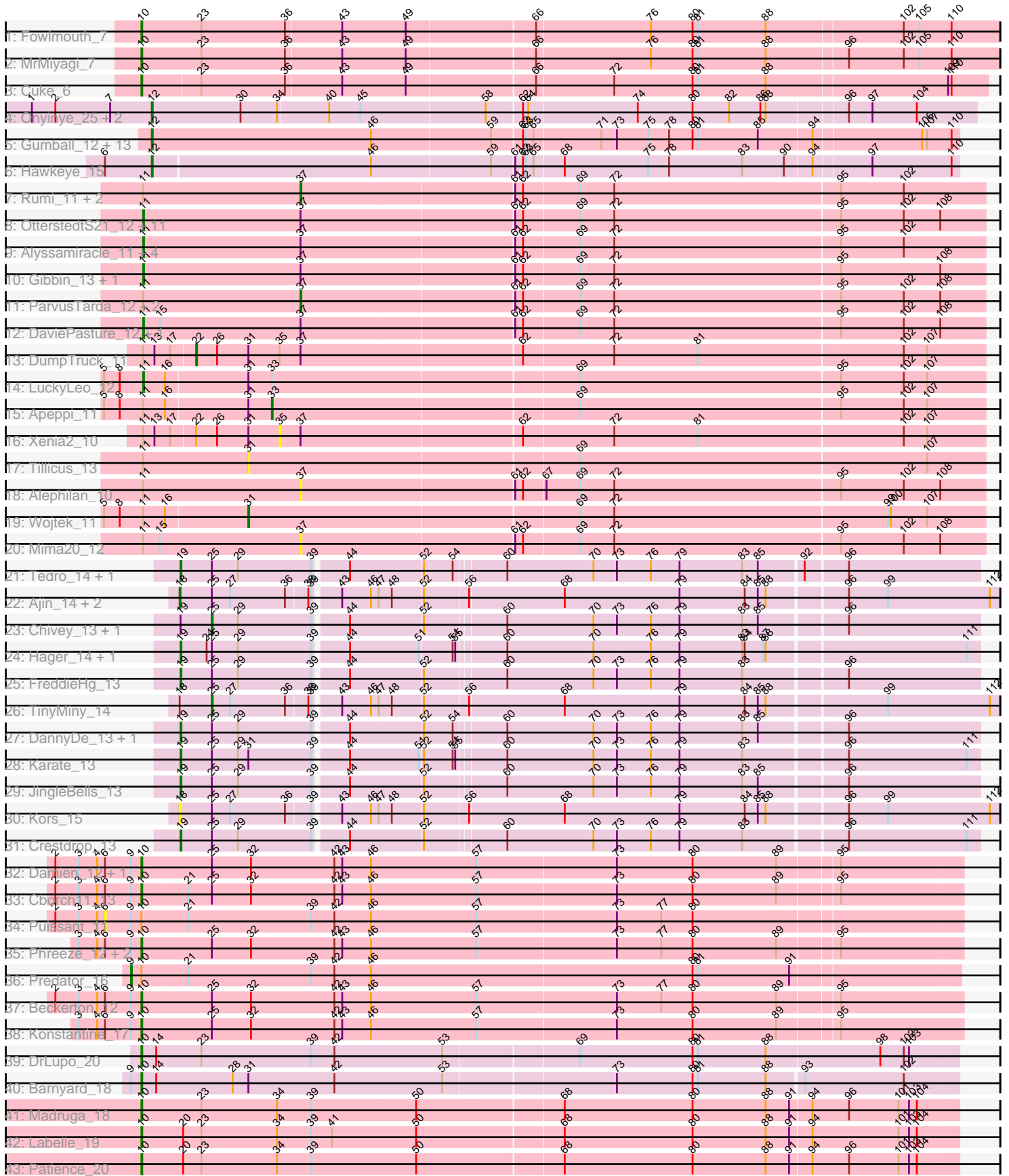


Pham 195542



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 195542 Report

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

Pham number 195542 has 88 members, 9 are drafts.

Phages represented in each track:

- Track 1 : Fowlmouth\_7
- Track 2 : MrMiyagi\_7
- Track 3 : Cuke\_6
- Track 4 : Onyinye\_25, Leopard\_24, Aikoy\_24
- Track 5 : Gumball\_12, KandZ\_13, SirHarley\_12, Delton\_13, Thoth\_13, Nova\_13, BigMama\_11, Penelope2018\_13, Troll4\_13, Visconti\_13, Giuseppe\_13, Erk16\_13, Mopey\_13, Butterscotch\_13
- Track 6 : Hawkeye\_15
- Track 7 : Rumi\_11, Avian\_11, Jamemuya19\_10
- Track 8 : OtterstedtS21\_12, Fulcrum\_13, Ranch\_12, Lila22\_13, Sampudon\_13, Patos\_13, DoobyDoo\_11, Sadboi\_12, MoiGyank\_14, Yikes\_13, NorManre\_13, GOATification\_13
- Track 9 : Alyssamiracle\_11, Genamy16\_11, Lambo\_12, NovaSharks\_11, Erutan\_12
- Track 10 : Gibbin\_13, BirthdayBoy\_13
- Track 11 : ParvusTarda\_12, GretelLyn\_12, Jalebi\_13
- Track 12 : DaviePasture\_12, Zany\_12
- Track 13 : DumpTruck\_11
- Track 14 : LuckyLeo\_12
- Track 15 : Apeppi\_11
- Track 16 : Xenia2\_10
- Track 17 : Tillicus\_13
- Track 18 : Alephilan\_10
- Track 19 : Wojtek\_11
- Track 20 : Mima20\_12
- Track 21 : Tedro\_14, Haunter\_14
- Track 22 : Ajin\_14, RikSengupta\_14, Sparcetus\_14
- Track 23 : Chivey\_13, Hiddenleaf\_13
- Track 24 : Hager\_14, Rie18\_14
- Track 25 : FreddieHg\_13
- Track 26 : TinyMiny\_14
- Track 27 : DannyDe\_13, Snakehole\_15
- Track 28 : Karate\_13
- Track 29 : JingleBells\_13
- Track 30 : Kors\_15
- Track 31 : Crestdrop\_13
- Track 32 : Damien\_12, Megatron06\_14
- Track 33 : Cborch11\_13

- Track 34 : Puissant\_11
- Track 35 : Phreeze\_12, Thumb\_12, Oaker\_12
- Track 36 : Predator\_16
- Track 37 : Beckerton\_12
- Track 38 : Konstantine\_17
- Track 39 : DrLupo\_20
- Track 40 : Barnyard\_18
- Track 41 : Madrugua\_18
- Track 42 : Labelle\_19
- Track 43 : Patience\_20

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

The start number called the most often in the published annotations is 11, it was called in 22 of the 79 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Alyssmiracle\_11, BirthdayBoy\_13, DaviePasture\_12, DoobyDoo\_11, Erutan\_12, Fulcrum\_13, GOATification\_13, Genamy16\_11, Gibbin\_13, Lambo\_12, Lila22\_13, LuckyLeo\_12, MoiGyank\_14, NorManre\_13, NovaSharks\_11, OtterstedtS21\_12, Patos\_13, Ranch\_12, Sadboi\_12, Sampudon\_13, Yikes\_13, Zany\_12,

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

- Alephilan\_10, Apeppi\_11, Avian\_11, DumpTruck\_11, Gretellyn\_12, Jalebi\_13, Jamemuya19\_10, Mima20\_12, ParvusTarda\_12, Rumi\_11, Tillicus\_13, Wojtek\_11, Xenia2\_10,

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

- Aikoy\_24, Ajin\_14, Barnyard\_18, Beckerton\_12, BigMama\_11, Butterscotch\_13, Cborch11\_13, Chivey\_13, Crestdrop\_13, Cuke\_6, Damien\_12, DannyDe\_13, Delton\_13, DrLupo\_20, Erk16\_13, Fowlmouth\_7, FreddieHg\_13, Giuseppe\_13, Gumball\_12, Hager\_14, Haunter\_14, Hawkeye\_15, Hiddenleaf\_13, JingleBells\_13, KandZ\_13, Karate\_13, Konstantine\_17, Kors\_15, Labelle\_19, Leopard\_24, Madrugua\_18, Megatron06\_14, Mopey\_13, MrMiyagi\_7, Nova\_13, Oaker\_12, Onyinye\_25, Patience\_20, Penelope2018\_13, Phreeze\_12, Predator\_16, Puissant\_11, Rie18\_14, RikSengupta\_14, SirHarley\_12, Snakehole\_15, Sparcetus\_14, Tedro\_14, Thoth\_13, Thumb\_12, TinyMiny\_14, Troll4\_13, Visconti\_13,

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

Start 6:

- Found in 10 of 88 ( 11.4% ) of genes in pham
- No Manual Annotations of this start.
- Called 10.0% of time when present
- Phage (with cluster) where this start called: Puissant\_11 (H1),

Start 9:

- Found in 11 of 88 ( 12.5% ) of genes in pham
- Manual Annotations of this start: 1 of 79

- Called 9.1% of time when present
- Phage (with cluster) where this start called: Predator\_16 (H1),

#### Start 10:

- Found in 18 of 88 ( 20.5% ) of genes in pham
- Manual Annotations of this start: 16 of 79
- Called 88.9% of time when present
- Phage (with cluster) where this start called: Barnyard\_18 (H2), Beckerton\_12 (H1), Cborch11\_13 (H1), Cuke\_6 (AC), Damien\_12 (H1), DrLupo\_20 (H2), Fowlmouth\_7 (AC), Konstantine\_17 (H1), Labelle\_19 (U), Madrugua\_18 (U), Megatron06\_14 (H1), MrMiyagi\_7 (AC), Oaker\_12 (H1), Patience\_20 (U), Phreeze\_12 (H1), Thumb\_12 (H1),

#### Start 11:

- Found in 35 of 88 ( 39.8% ) of genes in pham
- Manual Annotations of this start: 22 of 79
- Called 62.9% of time when present
- Phage (with cluster) where this start called: Alyssamiracle\_11 (DV), BirthdayBoy\_13 (DV), DaviePasture\_12 (DV), DoobyDoo\_11 (DV), Erutan\_12 (DV), Fulcrum\_13 (DV), GOATification\_13 (DV), Genamy16\_11 (DV), Gibbin\_13 (DV), Lambo\_12 (DV), Lila22\_13 (DV), LuckyLeo\_12 (DV), MoiGyank\_14 (DV), NorManre\_13 (DV), NovaSharks\_11 (DV), OtterstedtS21\_12 (DV), Patos\_13 (DV), Ranch\_12 (DV), Sadboi\_12 (DV), Sampudon\_13 (DV), Yikes\_13 (DV), Zany\_12 (DV),

#### Start 12:

- Found in 18 of 88 ( 20.5% ) of genes in pham
- Manual Annotations of this start: 18 of 79
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aikoy\_24 (AE), BigMama\_11 (D1), Butterscotch\_13 (D1), Delton\_13 (D1), Erk16\_13 (D1), Giuseppe\_13 (D1), Gumball\_12 (D1), Hawkeye\_15 (D2), KandZ\_13 (D1), Leopard\_24 (AE), Mopey\_13 (D1), Nova\_13 (D1), Onyinye\_25 (AE), Penelope2018\_13 (D1), SirHarley\_12 (D1), Thoth\_13 (D1), Troll4\_13 (D1), Visconti\_13 (D1),

#### Start 18:

- Found in 5 of 88 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 3 of 79
- Called 80.0% of time when present
- Phage (with cluster) where this start called: Ajin\_14 (EF), Kors\_15 (EF), RikSengupta\_14 (EF), Sparcetus\_14 (EF),

#### Start 19:

- Found in 12 of 88 ( 13.6% ) of genes in pham
- Manual Annotations of this start: 9 of 79
- Called 83.3% of time when present
- Phage (with cluster) where this start called: Crestdrop\_13 (EF), DannyDe\_13 (EF), FreddieHg\_13 (EF), Hager\_14 (EF), Haunter\_14 (EF), JingleBells\_13 (EF), Karate\_13 (EF), Rie18\_14 (EF), Snakehole\_15 (EF), Tedro\_14 (EF),

#### Start 22:

- Found in 2 of 88 ( 2.3% ) of genes in pham
- Manual Annotations of this start: 1 of 79
- Called 50.0% of time when present

- Phage (with cluster) where this start called: DumpTruck\_11 (DV),

Start 25:

- Found in 25 of 88 ( 28.4% ) of genes in pham
- Manual Annotations of this start: 3 of 79
- Called 12.0% of time when present
- Phage (with cluster) where this start called: Chivey\_13 (EF), Hiddenleaf\_13 (EF), TinyMiny\_14 (EF),

Start 31:

- Found in 8 of 88 ( 9.1% ) of genes in pham
- Manual Annotations of this start: 1 of 79
- Called 25.0% of time when present
- Phage (with cluster) where this start called: Tillicus\_13 (DV), Wojtek\_11 (DV),

Start 33:

- Found in 2 of 88 ( 2.3% ) of genes in pham
- Manual Annotations of this start: 1 of 79
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Apeppi\_11 (DV),

Start 35:

- Found in 2 of 88 ( 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: Xenia2\_10 (DV),

Start 37:

- Found in 31 of 88 ( 35.2% ) of genes in pham
- Manual Annotations of this start: 4 of 79
- Called 25.8% of time when present
- Phage (with cluster) where this start called: Alephilan\_10 (DV), Avian\_11 (DV), GretelLyn\_12 (DV), Jalebi\_13 (DV), Jamemuya19\_10 (DV), Mima20\_12 (DV), ParvusTarda\_12 (DV), Rumi\_11 (DV),

### **Summary by clusters:**

There are 9 clusters represented in this pham: AC, H1, AE, H2, EF, U, DV, D2, D1,

Info for manual annotations of cluster AC:

- Start number 10 was manually annotated 3 times for cluster AC.

Info for manual annotations of cluster AE:

- Start number 12 was manually annotated 3 times for cluster AE.

Info for manual annotations of cluster D1:

- Start number 12 was manually annotated 14 times for cluster D1.

Info for manual annotations of cluster D2:

- Start number 12 was manually annotated 1 time for cluster D2.

Info for manual annotations of cluster DV:

- Start number 11 was manually annotated 22 times for cluster DV.

- Start number 22 was manually annotated 1 time for cluster DV.
- Start number 31 was manually annotated 1 time for cluster DV.
- Start number 33 was manually annotated 1 time for cluster DV.
- Start number 37 was manually annotated 4 times for cluster DV.

Info for manual annotations of cluster EF:

- Start number 18 was manually annotated 3 times for cluster EF.
- Start number 19 was manually annotated 9 times for cluster EF.
- Start number 25 was manually annotated 3 times for cluster EF.

Info for manual annotations of cluster H1:

- Start number 9 was manually annotated 1 time for cluster H1.
- Start number 10 was manually annotated 8 times for cluster H1.

Info for manual annotations of cluster H2:

- Start number 10 was manually annotated 2 times for cluster H2.

Info for manual annotations of cluster U:

- Start number 10 was manually annotated 3 times for cluster U.

### **Gene Information:**

Gene: Aikoy\_24 Start: 14575, Stop: 15495, Start Num: 12

Candidate Starts for Aikoy\_24:

(1, 14437), (2, 14464), (7, 14527), (Start: 12 @14575 has 18 MA's), (30, 14674), (34, 14716), (40, 14773), (45, 14809), (58, 14947), (62, 14986), (64, 14992), (74, 15115), (80, 15178), (82, 15220), (86, 15256), (88, 15262), (96, 15349), (97, 15376), (104, 15427),

Gene: Ajin\_14 Start: 6294, Stop: 7199, Start Num: 18

Candidate Starts for Ajin\_14:

(Start: 18 @6294 has 3 MA's), (Start: 25 @6330 has 3 MA's), (27, 6351), (36, 6414), (38, 6438), (39, 6441), (43, 6468), (46, 6501), (47, 6510), (48, 6525), (52, 6558), (56, 6606), (68, 6711), (79, 6843), (84, 6918), (85, 6933), (88, 6942), (96, 7026), (99, 7071), (112, 7188),

Gene: Alephilan\_10 Start: 9149, Stop: 9916, Start Num: 37

Candidate Starts for Alephilan\_10:

(Start: 11 @8969 has 22 MA's), (Start: 37 @9149 has 4 MA's), (61, 9386), (62, 9395), (67, 9419), (69, 9458), (72, 9497), (95, 9752), (102, 9824), (108, 9866),

Gene: Alyssamiracle\_11 Start: 7442, Stop: 8389, Start Num: 11

Candidate Starts for Alyssamiracle\_11:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: Apeppi\_11 Start: 9296, Stop: 10096, Start Num: 33

Candidate Starts for Apeppi\_11:

(5, 9107), (8, 9125), (Start: 11 @9152 has 22 MA's), (16, 9176), (Start: 31 @9269 has 1 MA's), (Start: 33 @9296 has 1 MA's), (69, 9638), (95, 9932), (102, 10004), (107, 10031),

Gene: Avian\_11 Start: 7622, Stop: 8389, Start Num: 37

Candidate Starts for Avian\_11:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: Barnyard\_18 Start: 9413, Stop: 10318, Start Num: 10

Candidate Starts for Barnyard\_18:

(Start: 9 @9401 has 1 MA's), (Start: 10 @9413 has 16 MA's), (14, 9425), (28, 9509), (Start: 31 @9527 has 1 MA's), (42, 9626), (53, 9749), (73, 9938), (80, 10025), (81, 10031), (88, 10109), (93, 10148), (102, 10259),

Gene: Beckerton\_12 Start: 8502, Stop: 9422, Start Num: 10

Candidate Starts for Beckerton\_12:

(2, 8403), (3, 8430), (4, 8451), (6, 8460), (Start: 9 @8490 has 1 MA's), (Start: 10 @8502 has 16 MA's), (Start: 25 @8574 has 3 MA's), (32, 8619), (42, 8715), (43, 8724), (46, 8757), (57, 8877), (73, 9036), (77, 9087), (80, 9123), (89, 9219), (95, 9285),

Gene: BigMama\_11 Start: 8804, Stop: 9709, Start Num: 12

Candidate Starts for BigMama\_11:

(Start: 12 @8804 has 18 MA's), (46, 9056), (59, 9188), (62, 9221), (63, 9224), (65, 9233), (71, 9308), (73, 9326), (75, 9362), (78, 9386), (80, 9413), (81, 9419), (85, 9488), (94, 9548), (106, 9668), (107, 9674), (110, 9701),

Gene: BirthdayBoy\_13 Start: 9888, Stop: 10835, Start Num: 11

Candidate Starts for BirthdayBoy\_13:

(Start: 11 @9888 has 22 MA's), (Start: 37 @10068 has 4 MA's), (61, 10305), (62, 10314), (69, 10377), (72, 10416), (95, 10671), (108, 10785),

Gene: Butterscotch\_13 Start: 8791, Stop: 9696, Start Num: 12

Candidate Starts for Butterscotch\_13:

(Start: 12 @8791 has 18 MA's), (46, 9043), (59, 9175), (62, 9208), (63, 9211), (65, 9220), (71, 9295), (73, 9313), (75, 9349), (78, 9373), (80, 9400), (81, 9406), (85, 9475), (94, 9535), (106, 9655), (107, 9661), (110, 9688),

Gene: Cborch11\_13 Start: 7967, Stop: 8887, Start Num: 10

Candidate Starts for Cborch11\_13:

(2, 7868), (3, 7895), (4, 7916), (6, 7925), (Start: 9 @7955 has 1 MA's), (Start: 10 @7967 has 16 MA's), (21, 8012), (Start: 25 @8039 has 3 MA's), (32, 8084), (42, 8180), (43, 8189), (46, 8222), (57, 8342), (73, 8501), (80, 8588), (89, 8684), (95, 8750),

Gene: Chivey\_13 Start: 6218, Stop: 7066, Start Num: 25

Candidate Starts for Chivey\_13:

(Start: 19 @6182 has 9 MA's), (Start: 25 @6218 has 3 MA's), (29, 6248), (39, 6332), (44, 6368), (52, 6449), (60, 6536), (70, 6635), (73, 6662), (76, 6701), (79, 6734), (83, 6806), (85, 6824), (96, 6917),

Gene: Crestdrop\_13 Start: 6055, Stop: 6939, Start Num: 19

Candidate Starts for Crestdrop\_13:

(Start: 19 @6055 has 9 MA's), (Start: 25 @6091 has 3 MA's), (29, 6121), (39, 6205), (44, 6241), (52, 6322), (60, 6409), (70, 6508), (73, 6535), (76, 6574), (79, 6607), (83, 6679), (96, 6790), (111, 6925),

Gene: Cuke\_6 Start: 4018, Stop: 4962, Start Num: 10

Candidate Starts for Cuke\_6:

(Start: 10 @4018 has 16 MA's), (23, 4081), (36, 4177), (43, 4240), (49, 4312), (66, 4453), (72, 4540), (80, 4630), (81, 4636), (88, 4714), (109, 4918), (110, 4921),

Gene: Damien\_12 Start: 7967, Stop: 8887, Start Num: 10

Candidate Starts for Damien\_12:

(2, 7868), (3, 7895), (4, 7916), (6, 7925), (Start: 9 @7955 has 1 MA's), (Start: 10 @7967 has 16 MA's), (Start: 25 @8039 has 3 MA's), (32, 8084), (42, 8180), (43, 8189), (46, 8222), (57, 8342), (73, 8501), (80, 8588), (89, 8684), (95, 8750),

Gene: DannyDe\_13 Start: 6173, Stop: 7057, Start Num: 19

Candidate Starts for DannyDe\_13:

(Start: 19 @6173 has 9 MA's), (Start: 25 @6209 has 3 MA's), (29, 6239), (39, 6323), (44, 6359), (52, 6440), (54, 6473), (60, 6527), (70, 6626), (73, 6653), (76, 6692), (79, 6725), (83, 6797), (85, 6815), (96, 6908),

Gene: DaviePasture\_12 Start: 9645, Stop: 10592, Start Num: 11

Candidate Starts for DaviePasture\_12:

(Start: 11 @9645 has 22 MA's), (15, 9663), (Start: 37 @9825 has 4 MA's), (61, 10062), (62, 10071), (69, 10134), (72, 10173), (95, 10428), (102, 10500), (108, 10542),

Gene: Delton\_13 Start: 8800, Stop: 9705, Start Num: 12

Candidate Starts for Delton\_13:

(Start: 12 @8800 has 18 MA's), (46, 9052), (59, 9184), (62, 9217), (63, 9220), (65, 9229), (71, 9304), (73, 9322), (75, 9358), (78, 9382), (80, 9409), (81, 9415), (85, 9484), (94, 9544), (106, 9664), (107, 9670), (110, 9697),

Gene: DoobyDoo\_11 Start: 8822, Stop: 9769, Start Num: 11

Candidate Starts for DoobyDoo\_11:

(Start: 11 @8822 has 22 MA's), (Start: 37 @9002 has 4 MA's), (61, 9239), (62, 9248), (69, 9311), (72, 9350), (95, 9605), (102, 9677), (108, 9719),

Gene: DrLupo\_20 Start: 9845, Stop: 10753, Start Num: 10

Candidate Starts for DrLupo\_20:

(Start: 10 @9845 has 16 MA's), (14, 9857), (23, 9905), (39, 10031), (42, 10058), (53, 10181), (69, 10328), (80, 10457), (81, 10463), (88, 10541), (98, 10667), (102, 10694), (103, 10700),

Gene: DumpTruck\_11 Start: 9142, Stop: 10029, Start Num: 22

Candidate Starts for DumpTruck\_11:

(Start: 11 @9085 has 22 MA's), (13, 9097), (17, 9115), (Start: 22 @9142 has 1 MA's), (26, 9166), (Start: 31 @9202 has 1 MA's), (35, 9238), (Start: 37 @9262 has 4 MA's), (62, 9508), (72, 9610), (81, 9706), (102, 9937), (107, 9964),

Gene: Erk16\_13 Start: 8794, Stop: 9699, Start Num: 12

Candidate Starts for Erk16\_13:

(Start: 12 @8794 has 18 MA's), (46, 9046), (59, 9178), (62, 9211), (63, 9214), (65, 9223), (71, 9298), (73, 9316), (75, 9352), (78, 9376), (80, 9403), (81, 9409), (85, 9478), (94, 9538), (106, 9658), (107, 9664), (110, 9691),

Gene: Erutan\_12 Start: 9335, Stop: 10282, Start Num: 11

Candidate Starts for Erutan\_12:

(Start: 11 @9335 has 22 MA's), (Start: 37 @9515 has 4 MA's), (61, 9752), (62, 9761), (69, 9824), (72, 9863), (95, 10118), (102, 10190),

Gene: Fowlmouth\_7 Start: 4184, Stop: 5143, Start Num: 10

Candidate Starts for Fowlmouth\_7:



(Start: 10 @4184 has 16 MA's), (23, 4250), (36, 4346), (43, 4409), (49, 4481), (66, 4622), (76, 4751), (80, 4799), (81, 4805), (88, 4883), (102, 5036), (105, 5054), (110, 5090),

Gene: FreddieHg\_13 Start: 6195, Stop: 7079, Start Num: 19

Candidate Starts for FreddieHg\_13:

(Start: 19 @6195 has 9 MA's), (Start: 25 @6231 has 3 MA's), (29, 6261), (39, 6345), (44, 6381), (52, 6462), (60, 6549), (70, 6648), (73, 6675), (76, 6714), (79, 6747), (83, 6819), (96, 6930),

Gene: Fulcrum\_13 Start: 9868, Stop: 10815, Start Num: 11

Candidate Starts for Fulcrum\_13:

(Start: 11 @9868 has 22 MA's), (Start: 37 @10048 has 4 MA's), (61, 10285), (62, 10294), (69, 10357), (72, 10396), (95, 10651), (102, 10723), (108, 10765),

Gene: GOATification\_13 Start: 9868, Stop: 10815, Start Num: 11

Candidate Starts for GOATification\_13:

(Start: 11 @9868 has 22 MA's), (Start: 37 @10048 has 4 MA's), (61, 10285), (62, 10294), (69, 10357), (72, 10396), (95, 10651), (102, 10723), (108, 10765),

Gene: Genamy16\_11 Start: 7442, Stop: 8389, Start Num: 11

Candidate Starts for Genamy16\_11:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: Gibbin\_13 Start: 9928, Stop: 10875, Start Num: 11

Candidate Starts for Gibbin\_13:

(Start: 11 @9928 has 22 MA's), (Start: 37 @10108 has 4 MA's), (61, 10345), (62, 10354), (69, 10417), (72, 10456), (95, 10711), (108, 10825),

Gene: Giuseppe\_13 Start: 8783, Stop: 9688, Start Num: 12

Candidate Starts for Giuseppe\_13:

(Start: 12 @8783 has 18 MA's), (46, 9035), (59, 9167), (62, 9200), (63, 9203), (65, 9212), (71, 9287), (73, 9305), (75, 9341), (78, 9365), (80, 9392), (81, 9398), (85, 9467), (94, 9527), (106, 9647), (107, 9653), (110, 9680),

Gene: Gretellyn\_12 Start: 10382, Stop: 11149, Start Num: 37

Candidate Starts for Gretellyn\_12:

(Start: 11 @10202 has 22 MA's), (Start: 37 @10382 has 4 MA's), (61, 10619), (62, 10628), (69, 10691), (72, 10730), (95, 10985), (102, 11057), (108, 11099),

Gene: Gumball\_12 Start: 8738, Stop: 9643, Start Num: 12

Candidate Starts for Gumball\_12:

(Start: 12 @8738 has 18 MA's), (46, 8990), (59, 9122), (62, 9155), (63, 9158), (65, 9167), (71, 9242), (73, 9260), (75, 9296), (78, 9320), (80, 9347), (81, 9353), (85, 9422), (94, 9482), (106, 9602), (107, 9608), (110, 9635),

Gene: Hager\_14 Start: 6443, Stop: 7327, Start Num: 19

Candidate Starts for Hager\_14:

(Start: 19 @6443 has 9 MA's), (24, 6473), (Start: 25 @6479 has 3 MA's), (29, 6509), (39, 6593), (44, 6629), (51, 6707), (54, 6743), (55, 6746), (60, 6797), (70, 6896), (76, 6962), (79, 6995), (83, 7067), (84, 7070), (87, 7091), (88, 7094), (111, 7313),

Gene: Haunter\_14 Start: 6398, Stop: 7282, Start Num: 19

Candidate Starts for Haunter\_14:

(Start: 19 @6398 has 9 MA's), (Start: 25 @6434 has 3 MA's), (29, 6464), (39, 6548), (44, 6584), (52, 6665), (54, 6698), (60, 6752), (70, 6851), (73, 6878), (76, 6917), (79, 6950), (83, 7022), (85, 7040), (92, 7088), (96, 7133),

Gene: Hawkeye\_15 Start: 8736, Stop: 9635, Start Num: 12

Candidate Starts for Hawkeye\_15:

(6, 8682), (Start: 12 @8736 has 18 MA's), (46, 8982), (59, 9114), (61, 9138), (62, 9147), (63, 9150), (65, 9159), (68, 9192), (75, 9288), (78, 9312), (83, 9396), (90, 9444), (94, 9474), (97, 9537), (110, 9627),

Gene: Hiddenleaf\_13 Start: 6218, Stop: 7066, Start Num: 25

Candidate Starts for Hiddenleaf\_13:

(Start: 19 @6182 has 9 MA's), (Start: 25 @6218 has 3 MA's), (29, 6248), (39, 6332), (44, 6368), (52, 6449), (60, 6536), (70, 6635), (73, 6662), (76, 6701), (79, 6734), (83, 6806), (85, 6824), (96, 6917),

Gene: Jalebi\_13 Start: 10558, Stop: 11325, Start Num: 37

Candidate Starts for Jalebi\_13:

(Start: 11 @10378 has 22 MA's), (Start: 37 @10558 has 4 MA's), (61, 10795), (62, 10804), (69, 10867), (72, 10906), (95, 11161), (102, 11233), (108, 11275),

Gene: Jamemuya19\_10 Start: 7622, Stop: 8389, Start Num: 37

Candidate Starts for Jamemuya19\_10:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: JingleBells\_13 Start: 6251, Stop: 7135, Start Num: 19

Candidate Starts for JingleBells\_13:

(Start: 19 @6251 has 9 MA's), (Start: 25 @6287 has 3 MA's), (29, 6317), (39, 6401), (44, 6437), (52, 6518), (60, 6605), (70, 6704), (73, 6731), (76, 6770), (79, 6803), (83, 6875), (85, 6893), (96, 6986),

Gene: KandZ\_13 Start: 8888, Stop: 9793, Start Num: 12

Candidate Starts for KandZ\_13:

(Start: 12 @8888 has 18 MA's), (46, 9140), (59, 9272), (62, 9305), (63, 9308), (65, 9317), (71, 9392), (73, 9410), (75, 9446), (78, 9470), (80, 9497), (81, 9503), (85, 9572), (94, 9632), (106, 9752), (107, 9758), (110, 9785),

Gene: Karate\_13 Start: 6403, Stop: 7287, Start Num: 19

Candidate Starts for Karate\_13:

(Start: 19 @6403 has 9 MA's), (Start: 25 @6439 has 3 MA's), (29, 6469), (Start: 31 @6481 has 1 MA's), (39, 6553), (44, 6589), (51, 6667), (52, 6670), (54, 6703), (55, 6706), (60, 6757), (70, 6856), (73, 6883), (76, 6922), (79, 6955), (83, 7027), (96, 7138), (111, 7273),

Gene: Konstantine\_17 Start: 9166, Stop: 10086, Start Num: 10

Candidate Starts for Konstantine\_17:

(3, 9094), (4, 9115), (6, 9124), (Start: 9 @9154 has 1 MA's), (Start: 10 @9166 has 16 MA's), (Start: 25 @9238 has 3 MA's), (32, 9283), (42, 9379), (43, 9388), (46, 9421), (57, 9541), (73, 9700), (80, 9787), (89, 9883), (95, 9949),

Gene: Kors\_15 Start: 6327, Stop: 7232, Start Num: 18

Candidate Starts for Kors\_15:

(Start: 18 @6327 has 3 MA's), (Start: 25 @6363 has 3 MA's), (27, 6384), (36, 6447), (39, 6474), (43, 6501), (46, 6534), (47, 6543), (48, 6558), (52, 6591), (56, 6639), (68, 6744), (79, 6876), (84, 6951), (85, 6966), (88, 6975), (96, 7059), (99, 7104), (112, 7221),

Gene: Labelle\_19 Start: 10953, Stop: 11867, Start Num: 10

Candidate Starts for Labelle\_19:

(Start: 10 @10953 has 16 MA's), (20, 10992), (23, 11013), (34, 11100), (39, 11139), (41, 11163), (50, 11259), (68, 11421), (80, 11568), (88, 11652), (91, 11679), (94, 11703), (101, 11802), (103, 11814), (104, 11823),

Gene: Lambo\_12 Start: 9872, Stop: 10819, Start Num: 11

Candidate Starts for Lambo\_12:

(Start: 11 @9872 has 22 MA's), (Start: 37 @10052 has 4 MA's), (61, 10289), (62, 10298), (69, 10361), (72, 10400), (95, 10655), (102, 10727),

Gene: Leopard\_24 Start: 14860, Stop: 15780, Start Num: 12

Candidate Starts for Leopard\_24:

(1, 14722), (2, 14749), (7, 14812), (Start: 12 @14860 has 18 MA's), (30, 14959), (34, 15001), (40, 15058), (45, 15094), (58, 15232), (62, 15271), (64, 15277), (74, 15400), (80, 15463), (82, 15505), (86, 15541), (88, 15547), (96, 15634), (97, 15661), (104, 15712),

Gene: Lila22\_13 Start: 9823, Stop: 10770, Start Num: 11

Candidate Starts for Lila22\_13:

(Start: 11 @9823 has 22 MA's), (Start: 37 @10003 has 4 MA's), (61, 10240), (62, 10249), (69, 10312), (72, 10351), (95, 10606), (102, 10678), (108, 10720),

Gene: LuckyLeo\_12 Start: 9152, Stop: 10096, Start Num: 11

Candidate Starts for LuckyLeo\_12:

(5, 9107), (8, 9125), (Start: 11 @9152 has 22 MA's), (16, 9176), (Start: 31 @9269 has 1 MA's), (Start: 33 @9296 has 1 MA's), (69, 9638), (95, 9932), (102, 10004), (107, 10031),

Gene: Madruga\_18 Start: 10621, Stop: 11535, Start Num: 10

Candidate Starts for Madruga\_18:

(Start: 10 @10621 has 16 MA's), (23, 10681), (34, 10768), (39, 10807), (50, 10927), (68, 11089), (80, 11236), (88, 11320), (91, 11347), (94, 11371), (96, 11413), (101, 11470), (103, 11482), (104, 11491),

Gene: Megatron06\_14 Start: 8502, Stop: 9422, Start Num: 10

Candidate Starts for Megatron06\_14:

(2, 8403), (3, 8430), (4, 8451), (6, 8460), (Start: 9 @8490 has 1 MA's), (Start: 10 @8502 has 16 MA's), (Start: 25 @8574 has 3 MA's), (32, 8619), (42, 8715), (43, 8724), (46, 8757), (57, 8877), (73, 9036), (80, 9123), (89, 9219), (95, 9285),

Gene: Mima20\_12 Start: 9732, Stop: 10499, Start Num: 37

Candidate Starts for Mima20\_12:

(Start: 11 @9552 has 22 MA's), (15, 9570), (Start: 37 @9732 has 4 MA's), (61, 9969), (62, 9978), (69, 10041), (72, 10080), (95, 10335), (102, 10407), (108, 10449),

Gene: MoiGyank\_14 Start: 10239, Stop: 11186, Start Num: 11

Candidate Starts for MoiGyank\_14:

(Start: 11 @10239 has 22 MA's), (Start: 37 @10419 has 4 MA's), (61, 10656), (62, 10665), (69, 10728), (72, 10767), (95, 11022), (102, 11094), (108, 11136),

Gene: Mopey\_13 Start: 8791, Stop: 9696, Start Num: 12

Candidate Starts for Mopey\_13:

(Start: 12 @8791 has 18 MA's), (46, 9043), (59, 9175), (62, 9208), (63, 9211), (65, 9220), (71, 9295), (73, 9313), (75, 9349), (78, 9373), (80, 9400), (81, 9406), (85, 9475), (94, 9535), (106, 9655), (107,

9661), (110, 9688),

Gene: MrMiyagi\_7 Start: 4184, Stop: 5143, Start Num: 10

Candidate Starts for MrMiyagi\_7:

(Start: 10 @4184 has 16 MA's), (23, 4250), (36, 4346), (43, 4409), (49, 4481), (66, 4622), (76, 4751), (80, 4799), (81, 4805), (88, 4883), (96, 4973), (102, 5036), (105, 5054), (110, 5090),

Gene: NorManre\_13 Start: 9434, Stop: 10381, Start Num: 11

Candidate Starts for NorManre\_13:

(Start: 11 @9434 has 22 MA's), (Start: 37 @9614 has 4 MA's), (61, 9851), (62, 9860), (69, 9923), (72, 9962), (95, 10217), (102, 10289), (108, 10331),

Gene: Nova\_13 Start: 9215, Stop: 10120, Start Num: 12

Candidate Starts for Nova\_13:

(Start: 12 @9215 has 18 MA's), (46, 9467), (59, 9599), (62, 9632), (63, 9635), (65, 9644), (71, 9719), (73, 9737), (75, 9773), (78, 9797), (80, 9824), (81, 9830), (85, 9899), (94, 9959), (106, 10079), (107, 10085), (110, 10112),

Gene: NovaSharks\_11 Start: 7442, Stop: 8389, Start Num: 11

Candidate Starts for NovaSharks\_11:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: Oaker\_12 Start: 8223, Stop: 9143, Start Num: 10

Candidate Starts for Oaker\_12:

(3, 8151), (4, 8172), (6, 8181), (Start: 9 @8211 has 1 MA's), (Start: 10 @8223 has 16 MA's), (Start: 25 @8295 has 3 MA's), (32, 8340), (42, 8436), (43, 8445), (46, 8478), (57, 8598), (73, 8757), (77, 8808), (80, 8844), (89, 8940), (95, 9006),

Gene: Onyinye\_25 Start: 14741, Stop: 15661, Start Num: 12

Candidate Starts for Onyinye\_25:

(1, 14603), (2, 14630), (7, 14693), (Start: 12 @14741 has 18 MA's), (30, 14840), (34, 14882), (40, 14939), (45, 14975), (58, 15113), (62, 15152), (64, 15158), (74, 15281), (80, 15344), (82, 15386), (86, 15422), (88, 15428), (96, 15515), (97, 15542), (104, 15593),

Gene: OtterstedtS21\_12 Start: 9524, Stop: 10471, Start Num: 11

Candidate Starts for OtterstedtS21\_12:

(Start: 11 @9524 has 22 MA's), (Start: 37 @9704 has 4 MA's), (61, 9941), (62, 9950), (69, 10013), (72, 10052), (95, 10307), (102, 10379), (108, 10421),

Gene: ParvusTarda\_12 Start: 9186, Stop: 9953, Start Num: 37

Candidate Starts for ParvusTarda\_12:

(Start: 11 @9006 has 22 MA's), (Start: 37 @9186 has 4 MA's), (61, 9423), (62, 9432), (69, 9495), (72, 9534), (95, 9789), (102, 9861), (108, 9903),

Gene: Patience\_20 Start: 11512, Stop: 12426, Start Num: 10

Candidate Starts for Patience\_20:

(Start: 10 @11512 has 16 MA's), (20, 11551), (23, 11572), (34, 11659), (39, 11698), (50, 11818), (68, 11980), (80, 12127), (88, 12211), (91, 12238), (94, 12262), (96, 12304), (101, 12361), (103, 12373), (104, 12382),

Gene: Patos\_13 Start: 9434, Stop: 10381, Start Num: 11

Candidate Starts for Patos\_13:

(Start: 11 @9434 has 22 MA's), (Start: 37 @9614 has 4 MA's), (61, 9851), (62, 9860), (69, 9923), (72, 9962), (95, 10217), (102, 10289), (108, 10331),

Gene: Penelope2018\_13 Start: 8791, Stop: 9696, Start Num: 12

Candidate Starts for Penelope2018\_13:

(Start: 12 @8791 has 18 MA's), (46, 9043), (59, 9175), (62, 9208), (63, 9211), (65, 9220), (71, 9295), (73, 9313), (75, 9349), (78, 9373), (80, 9400), (81, 9406), (85, 9475), (94, 9535), (106, 9655), (107, 9661), (110, 9688),

Gene: Phreeze\_12 Start: 7967, Stop: 8887, Start Num: 10

Candidate Starts for Phreeze\_12:

(3, 7895), (4, 7916), (6, 7925), (Start: 9 @7955 has 1 MA's), (Start: 10 @7967 has 16 MA's), (Start: 25 @8039 has 3 MA's), (32, 8084), (42, 8180), (43, 8189), (46, 8222), (57, 8342), (73, 8501), (77, 8552), (80, 8588), (89, 8684), (95, 8750),

Gene: Predator\_16 Start: 9457, Stop: 10386, Start Num: 9

Candidate Starts for Predator\_16:

(Start: 9 @9457 has 1 MA's), (Start: 10 @9469 has 16 MA's), (21, 9514), (39, 9655), (42, 9682), (46, 9724), (80, 10090), (81, 10096), (91, 10201),

Gene: Puissant\_11 Start: 8343, Stop: 9305, Start Num: 6

Candidate Starts for Puissant\_11:

(2, 8286), (3, 8313), (4, 8334), (6, 8343), (Start: 9 @8373 has 1 MA's), (Start: 10 @8385 has 16 MA's), (21, 8430), (39, 8571), (42, 8598), (46, 8640), (57, 8760), (73, 8919), (77, 8970), (80, 9006),

Gene: Ranch\_12 Start: 8375, Stop: 9322, Start Num: 11

Candidate Starts for Ranch\_12:

(Start: 11 @8375 has 22 MA's), (Start: 37 @8555 has 4 MA's), (61, 8792), (62, 8801), (69, 8864), (72, 8903), (95, 9158), (102, 9230), (108, 9272),

Gene: Rie18\_14 Start: 6338, Stop: 7222, Start Num: 19

Candidate Starts for Rie18\_14:

(Start: 19 @6338 has 9 MA's), (24, 6368), (Start: 25 @6374 has 3 MA's), (29, 6404), (39, 6488), (44, 6524), (51, 6602), (54, 6638), (55, 6641), (60, 6692), (70, 6791), (76, 6857), (79, 6890), (83, 6962), (84, 6965), (87, 6986), (88, 6989), (111, 7208),

Gene: RikSengupta\_14 Start: 6397, Stop: 7302, Start Num: 18

Candidate Starts for RikSengupta\_14:

(Start: 18 @6397 has 3 MA's), (Start: 25 @6433 has 3 MA's), (27, 6454), (36, 6517), (38, 6541), (39, 6544), (43, 6571), (46, 6604), (47, 6613), (48, 6628), (52, 6661), (56, 6709), (68, 6814), (79, 6946), (84, 7021), (85, 7036), (88, 7045), (96, 7129), (99, 7174), (112, 7291),

Gene: Rumi\_11 Start: 7622, Stop: 8389, Start Num: 37

Candidate Starts for Rumi\_11:

(Start: 11 @7442 has 22 MA's), (Start: 37 @7622 has 4 MA's), (61, 7859), (62, 7868), (69, 7931), (72, 7970), (95, 8225), (102, 8297),

Gene: Sadboi\_12 Start: 10202, Stop: 11149, Start Num: 11

Candidate Starts for Sadboi\_12:

(Start: 11 @10202 has 22 MA's), (Start: 37 @10382 has 4 MA's), (61, 10619), (62, 10628), (69, 10691), (72, 10730), (95, 10985), (102, 11057), (108, 11099),

Gene: Sampudon\_13 Start: 10378, Stop: 11325, Start Num: 11

Candidate Starts for Sampudon\_13:

(Start: 11 @10378 has 22 MA's), (Start: 37 @10558 has 4 MA's), (61, 10795), (62, 10804), (69, 10867), (72, 10906), (95, 11161), (102, 11233), (108, 11275),

Gene: SirHarley\_12 Start: 8720, Stop: 9625, Start Num: 12

Candidate Starts for SirHarley\_12:

(Start: 12 @8720 has 18 MA's), (46, 8972), (59, 9104), (62, 9137), (63, 9140), (65, 9149), (71, 9224), (73, 9242), (75, 9278), (78, 9302), (80, 9329), (81, 9335), (85, 9404), (94, 9464), (106, 9584), (107, 9590), (110, 9617),

Gene: Snakehole\_15 Start: 6277, Stop: 7161, Start Num: 19

Candidate Starts for Snakehole\_15:

(Start: 19 @6277 has 9 MA's), (Start: 25 @6313 has 3 MA's), (29, 6343), (39, 6427), (44, 6463), (52, 6544), (54, 6577), (60, 6631), (70, 6730), (73, 6757), (76, 6796), (79, 6829), (83, 6901), (85, 6919), (96, 7012),

Gene: Sparcetus\_14 Start: 6276, Stop: 7181, Start Num: 18

Candidate Starts for Sparcetus\_14:

(Start: 18 @6276 has 3 MA's), (Start: 25 @6312 has 3 MA's), (27, 6333), (36, 6396), (38, 6420), (39, 6423), (43, 6450), (46, 6483), (47, 6492), (48, 6507), (52, 6540), (56, 6588), (68, 6693), (79, 6825), (84, 6900), (85, 6915), (88, 6924), (96, 7008), (99, 7053), (112, 7170),

Gene: Tedro\_14 Start: 6454, Stop: 7338, Start Num: 19

Candidate Starts for Tedro\_14:

(Start: 19 @6454 has 9 MA's), (Start: 25 @6490 has 3 MA's), (29, 6520), (39, 6604), (44, 6640), (52, 6721), (54, 6754), (60, 6808), (70, 6907), (73, 6934), (76, 6973), (79, 7006), (83, 7078), (85, 7096), (92, 7144), (96, 7189),

Gene: Thoth\_13 Start: 8788, Stop: 9693, Start Num: 12

Candidate Starts for Thoth\_13:

(Start: 12 @8788 has 18 MA's), (46, 9040), (59, 9172), (62, 9205), (63, 9208), (65, 9217), (71, 9292), (73, 9310), (75, 9346), (78, 9370), (80, 9397), (81, 9403), (85, 9472), (94, 9532), (106, 9652), (107, 9658), (110, 9685),

Gene: Thumb\_12 Start: 7968, Stop: 8888, Start Num: 10

Candidate Starts for Thumb\_12:

(3, 7896), (4, 7917), (6, 7926), (Start: 9 @7956 has 1 MA's), (Start: 10 @7968 has 16 MA's), (Start: 25 @8040 has 3 MA's), (32, 8085), (42, 8181), (43, 8190), (46, 8223), (57, 8343), (73, 8502), (77, 8553), (80, 8589), (89, 8685), (95, 8751),

Gene: Tillicus\_13 Start: 8861, Stop: 9688, Start Num: 31

Candidate Starts for Tillicus\_13:

(Start: 11 @8741 has 22 MA's), (Start: 31 @8861 has 1 MA's), (69, 9230), (107, 9623),

Gene: TinyMiny\_14 Start: 6310, Stop: 7179, Start Num: 25

Candidate Starts for TinyMiny\_14:

(Start: 18 @6274 has 3 MA's), (Start: 25 @6310 has 3 MA's), (27, 6331), (36, 6394), (38, 6418), (39, 6421), (43, 6448), (46, 6481), (47, 6490), (48, 6505), (52, 6538), (56, 6586), (68, 6691), (79, 6823), (84, 6898), (85, 6913), (88, 6922), (99, 7051), (112, 7168),

Gene: Troll4\_13 Start: 8792, Stop: 9697, Start Num: 12

Candidate Starts for Troll4\_13:

(Start: 12 @8792 has 18 MA's), (46, 9044), (59, 9176), (62, 9209), (63, 9212), (65, 9221), (71, 9296), (73, 9314), (75, 9350), (78, 9374), (80, 9401), (81, 9407), (85, 9476), (94, 9536), (106, 9656), (107, 9662), (110, 9689),

Gene: Visconti\_13 Start: 8801, Stop: 9706, Start Num: 12

Candidate Starts for Visconti\_13:

(Start: 12 @8801 has 18 MA's), (46, 9053), (59, 9185), (62, 9218), (63, 9221), (65, 9230), (71, 9305), (73, 9323), (75, 9359), (78, 9383), (80, 9410), (81, 9416), (85, 9485), (94, 9545), (106, 9665), (107, 9671), (110, 9698),

Gene: Wojtek\_11 Start: 9185, Stop: 10012, Start Num: 31

Candidate Starts for Wojtek\_11:

(5, 9023), (8, 9041), (Start: 11 @9068 has 22 MA's), (16, 9092), (Start: 31 @9185 has 1 MA's), (69, 9554), (72, 9593), (99, 9902), (100, 9905), (107, 9947),

Gene: Xenia2\_10 Start: 9277, Stop: 10068, Start Num: 35

Candidate Starts for Xenia2\_10:

(Start: 11 @9124 has 22 MA's), (13, 9136), (17, 9154), (Start: 22 @9181 has 1 MA's), (26, 9205), (Start: 31 @9241 has 1 MA's), (35, 9277), (Start: 37 @9301 has 4 MA's), (62, 9547), (72, 9649), (81, 9745), (102, 9976), (107, 10003),

Gene: Yikes\_13 Start: 10466, Stop: 11413, Start Num: 11

Candidate Starts for Yikes\_13:

(Start: 11 @10466 has 22 MA's), (Start: 37 @10646 has 4 MA's), (61, 10883), (62, 10892), (69, 10955), (72, 10994), (95, 11249), (102, 11321), (108, 11363),

Gene: Zany\_12 Start: 9592, Stop: 10539, Start Num: 11

Candidate Starts for Zany\_12:

(Start: 11 @9592 has 22 MA's), (15, 9610), (Start: 37 @9772 has 4 MA's), (61, 10009), (62, 10018), (69, 10081), (72, 10120), (95, 10375), (102, 10447), (108, 10489),