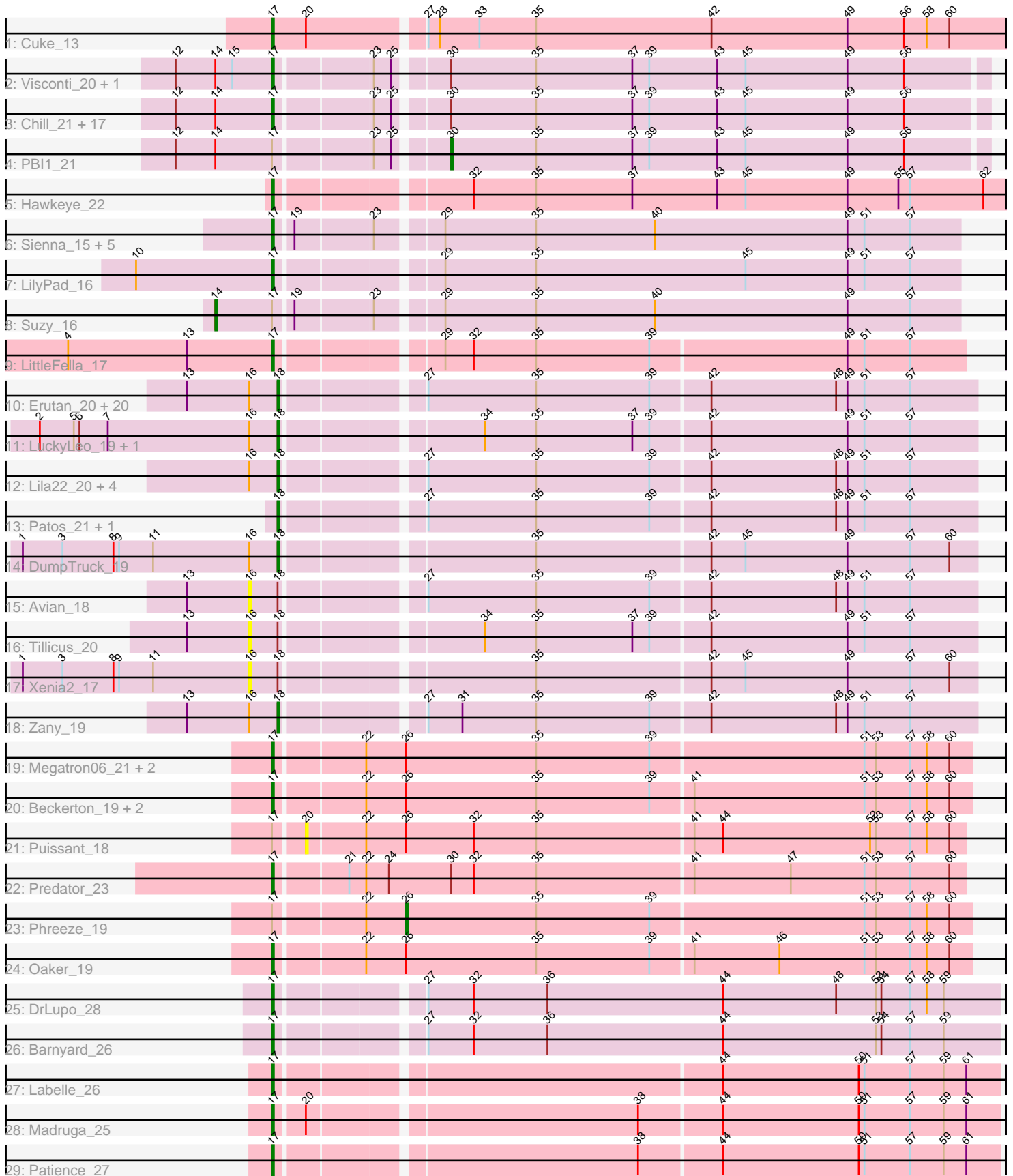


# Pham 196470



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 196470 Report

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

Pham number 196470 has 82 members, 8 are drafts.

Phages represented in each track:

- Track 1 : Cuke\_13
- Track 2 : Visconti\_20, Thoth\_20
- Track 3 : Chill\_21, WaldoWhy\_21, KandZ\_20, BigMama\_18, Nova\_20, Butterscotch\_20, SirHarley\_19, Erk16\_20, Troll4\_20, PLOT\_21, Prager\_20, Giuseppe\_20, Adjutor\_21, Gumball\_19, Helpful\_21, Penelope2018\_20, Mopey\_20, Delton\_20
- Track 4 : PBI1\_21
- Track 5 : Hawkeye\_22
- Track 6 : Sienna\_15, Beyoncage\_15, Djokovic\_15, Madi\_15, Terapin\_15, BiteSize\_15
- Track 7 : LilyPad\_16
- Track 8 : Suzy\_16
- Track 9 : LittleFella\_17
- Track 10 : Erutan\_20, Ranch\_20, Genamy16\_19, Gretellyn\_20, NovaSharks\_19, Jamemuya19\_17, Sampudon\_20, Rumi\_19, Mima20\_19, DoobyDoo\_19, Yikes\_21, Gibbin\_21, Lambo\_20, ParvusTarda\_20, Alyssamiracle\_19, Alephilan\_17, Wojtek\_19, Jalebi\_20, OtterstedtS21\_20, Sadboi\_20, DaviePasture\_20
- Track 11 : LuckyLeo\_19, Apeppi\_18
- Track 12 : Lila22\_20, MoiGyank\_22, BirthdayBoy\_21, GOATification\_21, Fulcrum\_21
- Track 13 : Patos\_21, NorManre\_21
- Track 14 : DumpTruck\_19
- Track 15 : Avian\_18
- Track 16 : Tillicus\_20
- Track 17 : Xenia2\_17
- Track 18 : Zany\_19
- Track 19 : Megatron06\_21, Thumb\_19, Damien\_19
- Track 20 : Beckerton\_19, Konstantine\_24, Cborch11\_20
- Track 21 : Puissant\_18
- Track 22 : Predator\_23
- Track 23 : Phreeze\_19
- Track 24 : Oaker\_19
- Track 25 : DrLupo\_28
- Track 26 : Barnyard\_26
- Track 27 : Labelle\_26
- Track 28 : Madruga\_25
- Track 29 : Patience\_27

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

The start number called the most often in the published annotations is 17, it was called in 42 of the 74 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Adjutor\_21, Barnyard\_26, Beckerton\_19, Beyoncage\_15, BigMama\_18, BiteSize\_15, Butterscotch\_20, Cborch11\_20, Chill\_21, Cuke\_13, Damien\_19, Delton\_20, Djokovic\_15, DrLupo\_28, Erk16\_20, Giuseppe\_20, Gumball\_19, Hawkeye\_22, Helpful\_21, KandZ\_20, Konstantine\_24, Labelle\_26, LilyPad\_16, LittleFella\_17, Madi\_15, Madrugua\_25, Megatron06\_21, Mopey\_20, Nova\_20, Oaker\_19, PLOT\_21, Patience\_27, Penelope2018\_20, Prager\_20, Predator\_23, Sienna\_15, SirHarley\_19, Terapin\_15, Thoth\_20, Thumb\_19, Troll4\_20, Visconti\_20, WaldoWhy\_21,

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

- PBI1\_21, Phreeze\_19, Puissant\_18, Suzy\_16,

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

- Alephilan\_17, Alyssamiracle\_19, Apeppi\_18, Avian\_18, BirthdayBoy\_21, DaviePasture\_20, DoobyDoo\_19, DumpTruck\_19, Erutan\_20, Fulcrum\_21, GOATification\_21, Genamy16\_19, Gibbin\_21, Gretellyn\_20, Jalebi\_20, Jamemuya19\_17, Lambo\_20, Lila22\_20, LuckyLeo\_19, Mima20\_19, MoiGyank\_22, NorManre\_21, NovaSharks\_19, OtterstedtS21\_20, ParvusTarda\_20, Patos\_21, Ranch\_20, Rumi\_19, Sadboi\_20, Sampudon\_20, Tillicus\_20, Wojtek\_19, Xenia2\_17, Yikes\_21, Zany\_19,

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

Start 14:

- Found in 22 of 82 ( 26.8% ) of genes in pham
- Manual Annotations of this start: 1 of 74
- Called 4.5% of time when present
- Phage (with cluster) where this start called: Suzy\_16 (DG1),

Start 16:

- Found in 33 of 82 ( 40.2% ) of genes in pham
- No Manual Annotations of this start.
- Called 9.1% of time when present
- Phage (with cluster) where this start called: Avian\_18 (DV), Tillicus\_20 (DV), Xenia2\_17 (DV),

Start 17:

- Found in 47 of 82 ( 57.3% ) of genes in pham
- Manual Annotations of this start: 42 of 74
- Called 91.5% of time when present
- Phage (with cluster) where this start called: Adjutor\_21 (D1), Barnyard\_26 (H2), Beckerton\_19 (H1), Beyoncage\_15 (DG1), BigMama\_18 (D1), BiteSize\_15 (DG1), Butterscotch\_20 (D1), Cborch11\_20 (H1), Chill\_21 (D1), Cuke\_13 (AC), Damien\_19

(H1), Delton\_20 (D1), Djokovic\_15 (DG1), DrLupo\_28 (H2), Erk16\_20 (D1), Giuseppe\_20 (D1), Gumball\_19 (D1), Hawkeye\_22 (D2), Helpful\_21 (D1), KandZ\_20 (D1), Konstantine\_24 (H1), Labelle\_26 (U), LilyPad\_16 (DG1), LittleFella\_17 (DG2), Madi\_15 (DG1), Madrugá\_25 (U), Megatron06\_21 (H1), Mopey\_20 (D1), Nova\_20 (D1), Oaker\_19 (H1), PLOT\_21 (D1), Patience\_27 (U), Penelope2018\_20 (D1), Prager\_20 (D1), Predator\_23 (H1), Sienna\_15 (DG1), SirHarley\_19 (D1), Terapin\_15 (DG1), Thoth\_20 (D1), Thumb\_19 (H1), Troll4\_20 (D1), Visconti\_20 (D1), WaldoWhy\_21 (D1),

Start 18:

- Found in 35 of 82 ( 42.7% ) of genes in pham
- Manual Annotations of this start: 29 of 74
- Called 91.4% of time when present
- Phage (with cluster) where this start called: Alephilan\_17 (DV), Alyssamiracle\_19 (DV), Apeppi\_18 (DV), BirthdayBoy\_21 (DV), DaviePasture\_20 (DV), DoobyDoo\_19 (DV), DumpTruck\_19 (DV), Erutan\_20 (DV), Fulcrum\_21 (DV), GOATification\_21 (DV), Genamy16\_19 (DV), Gibbin\_21 (DV), GretelLyn\_20 (DV), Jalebi\_20 (DV), Jamemuya19\_17 (DV), Lambo\_20 (DV), Lila22\_20 (DV), LuckyLeo\_19 (DV), Mima20\_19 (DV), MoiGyank\_22 (DV), NorManre\_21 (DV), NovaSharks\_19 (DV), OtterstedtS21\_20 (DV), ParvusTarda\_20 (DV), Patos\_21 (DV), Ranch\_20 (DV), Rumi\_19 (DV), Sadboi\_20 (DV), Sampudon\_20 (DV), Wojtek\_19 (DV), Yikes\_21 (DV), Zany\_19 (DV),

Start 20:

- Found in 3 of 82 ( 3.7% ) of genes in pham
- No Manual Annotations of this start.
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Puissant\_18 (H1),

Start 26:

- Found in 9 of 82 ( 11.0% ) of genes in pham
- Manual Annotations of this start: 1 of 74
- Called 11.1% of time when present
- Phage (with cluster) where this start called: Phreeze\_19 (H1),

Start 30:

- Found in 22 of 82 ( 26.8% ) of genes in pham
- Manual Annotations of this start: 1 of 74
- Called 4.5% of time when present
- Phage (with cluster) where this start called: PBI1\_21 (D1),

### Summary by clusters:

There are 9 clusters represented in this pham: AC, H2, H1, DG2, DG1, U, DV, D2, D1,

Info for manual annotations of cluster AC:

- Start number 17 was manually annotated 1 time for cluster AC.

Info for manual annotations of cluster D1:

- Start number 17 was manually annotated 19 times for cluster D1.
- Start number 30 was manually annotated 1 time for cluster D1.

Info for manual annotations of cluster D2:

- Start number 17 was manually annotated 1 time for cluster D2.

Info for manual annotations of cluster DG1:

- Start number 14 was manually annotated 1 time for cluster DG1.
- Start number 17 was manually annotated 7 times for cluster DG1.

Info for manual annotations of cluster DG2:

- Start number 17 was manually annotated 1 time for cluster DG2.

Info for manual annotations of cluster DV:

- Start number 18 was manually annotated 29 times for cluster DV.

Info for manual annotations of cluster H1:

- Start number 17 was manually annotated 8 times for cluster H1.
- Start number 26 was manually annotated 1 time for cluster H1.

Info for manual annotations of cluster H2:

- Start number 17 was manually annotated 2 times for cluster H2.

Info for manual annotations of cluster U:

- Start number 17 was manually annotated 3 times for cluster U.

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

Gene: Adjutor\_21 Start: 13129, Stop: 13491, Start Num: 17

Candidate Starts for Adjutor\_21:

(12, 13078), (Start: 14 @13099 has 1 MA's), (Start: 17 @13129 has 42 MA's), (23, 13177), (25, 13186), (Start: 30 @13210 has 1 MA's), (35, 13255), (37, 13306), (39, 13315), (43, 13351), (45, 13366), (49, 13420), (56, 13450),

Gene: Alephilan\_17 Start: 13618, Stop: 13971, Start Num: 18

Candidate Starts for Alephilan\_17:

(13, 13570), (16, 13603), (Start: 18 @13618 has 29 MA's), (27, 13684), (35, 13741), (39, 13801), (42, 13831), (48, 13897), (49, 13903), (51, 13912), (57, 13936),

Gene: Alyssamiracle\_19 Start: 12025, Stop: 12378, Start Num: 18

Candidate Starts for Alyssamiracle\_19:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: Apeppi\_18 Start: 13740, Stop: 14093, Start Num: 18

Candidate Starts for Apeppi\_18:

(2, 13614), (5, 13632), (6, 13635), (7, 13650), (16, 13725), (Start: 18 @13740 has 29 MA's), (34, 13836), (35, 13863), (37, 13914), (39, 13923), (42, 13953), (49, 14025), (51, 14034), (57, 14058),

Gene: Avian\_18 Start: 12010, Stop: 12378, Start Num: 16

Candidate Starts for Avian\_18:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: Barnyard\_26 Start: 14807, Stop: 15178, Start Num: 17

Candidate Starts for Barnyard\_26:

(Start: 17 @14807 has 42 MA's), (27, 14876), (32, 14900), (36, 14939), (44, 15032), (53, 15113), (54, 15116), (57, 15131), (59, 15149),

Gene: Beckerton\_19 Start: 13539, Stop: 13901, Start Num: 17

Candidate Starts for Beckerton\_19:

(Start: 17 @13539 has 42 MA's), (22, 13584), (Start: 26 @13605 has 1 MA's), (35, 13674), (39, 13734), (41, 13755), (51, 13845), (53, 13851), (57, 13869), (58, 13878), (60, 13890),

Gene: Beyoncage\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for Beyoncage\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: BigMama\_18 Start: 13205, Stop: 13567, Start Num: 17

Candidate Starts for BigMama\_18:

(12, 13154), (Start: 14 @13175 has 1 MA's), (Start: 17 @13205 has 42 MA's), (23, 13253), (25, 13262), (Start: 30 @13286 has 1 MA's), (35, 13331), (37, 13382), (39, 13391), (43, 13427), (45, 13442), (49, 13496), (56, 13526),

Gene: BirthdayBoy\_21 Start: 14471, Stop: 14824, Start Num: 18

Candidate Starts for BirthdayBoy\_21:

(16, 14456), (Start: 18 @14471 has 29 MA's), (27, 14537), (35, 14594), (39, 14654), (42, 14684), (48, 14750), (49, 14756), (51, 14765), (57, 14789),

Gene: BiteSize\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for BiteSize\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: Butterscotch\_20 Start: 13189, Stop: 13551, Start Num: 17

Candidate Starts for Butterscotch\_20:

(12, 13138), (Start: 14 @13159 has 1 MA's), (Start: 17 @13189 has 42 MA's), (23, 13237), (25, 13246), (Start: 30 @13270 has 1 MA's), (35, 13315), (37, 13366), (39, 13375), (43, 13411), (45, 13426), (49, 13480), (56, 13510),

Gene: Cborch11\_20 Start: 13002, Stop: 13364, Start Num: 17

Candidate Starts for Cborch11\_20:

(Start: 17 @13002 has 42 MA's), (22, 13047), (Start: 26 @13068 has 1 MA's), (35, 13137), (39, 13197), (41, 13218), (51, 13308), (53, 13314), (57, 13332), (58, 13341), (60, 13353),

Gene: Chill\_21 Start: 13195, Stop: 13557, Start Num: 17

Candidate Starts for Chill\_21:

(12, 13144), (Start: 14 @13165 has 1 MA's), (Start: 17 @13195 has 42 MA's), (23, 13243), (25, 13252), (Start: 30 @13276 has 1 MA's), (35, 13321), (37, 13372), (39, 13381), (43, 13417), (45, 13432), (49, 13486), (56, 13516),

Gene: Cuke\_13 Start: 8734, Stop: 9114, Start Num: 17

Candidate Starts for Cuke\_13:

(Start: 17 @8734 has 42 MA's), (20, 8752), (27, 8809), (28, 8815), (33, 8836), (35, 8866), (42, 8959), (49, 9031), (56, 9061), (58, 9073), (60, 9085),

Gene: Damien\_19 Start: 13001, Stop: 13363, Start Num: 17

Candidate Starts for Damien\_19:

(Start: 17 @13001 has 42 MA's), (22, 13046), (Start: 26 @13067 has 1 MA's), (35, 13136), (39, 13196), (51, 13307), (53, 13313), (57, 13331), (58, 13340), (60, 13352),

Gene: DaviePasture\_20 Start: 14228, Stop: 14581, Start Num: 18

Candidate Starts for DaviePasture\_20:

(13, 14180), (16, 14213), (Start: 18 @14228 has 29 MA's), (27, 14294), (35, 14351), (39, 14411), (42, 14441), (48, 14507), (49, 14513), (51, 14522), (57, 14546),

Gene: Delton\_20 Start: 13201, Stop: 13563, Start Num: 17

Candidate Starts for Delton\_20:

(12, 13150), (Start: 14 @13171 has 1 MA's), (Start: 17 @13201 has 42 MA's), (23, 13249), (25, 13258), (Start: 30 @13282 has 1 MA's), (35, 13327), (37, 13378), (39, 13387), (43, 13423), (45, 13438), (49, 13492), (56, 13522),

Gene: Djokovic\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for Djokovic\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: DoobyDoo\_19 Start: 13405, Stop: 13758, Start Num: 18

Candidate Starts for DoobyDoo\_19:

(13, 13357), (16, 13390), (Start: 18 @13405 has 29 MA's), (27, 13471), (35, 13528), (39, 13588), (42, 13618), (48, 13684), (49, 13690), (51, 13699), (57, 13723),

Gene: DrLupo\_28 Start: 15206, Stop: 15577, Start Num: 17

Candidate Starts for DrLupo\_28:

(Start: 17 @15206 has 42 MA's), (27, 15275), (32, 15299), (36, 15338), (44, 15431), (48, 15491), (53, 15512), (54, 15515), (57, 15530), (58, 15539), (59, 15548),

Gene: DumpTruck\_19 Start: 13662, Stop: 14015, Start Num: 18

Candidate Starts for DumpTruck\_19:

(1, 13527), (3, 13548), (8, 13575), (9, 13578), (11, 13596), (16, 13647), (Start: 18 @13662 has 29 MA's), (35, 13785), (42, 13875), (45, 13893), (49, 13947), (57, 13980), (60, 14001),

Gene: Erk16\_20 Start: 13192, Stop: 13554, Start Num: 17

Candidate Starts for Erk16\_20:

(12, 13141), (Start: 14 @13162 has 1 MA's), (Start: 17 @13192 has 42 MA's), (23, 13240), (25, 13249), (Start: 30 @13273 has 1 MA's), (35, 13318), (37, 13369), (39, 13378), (43, 13414), (45, 13429), (49, 13483), (56, 13513),

Gene: Erutan\_20 Start: 13918, Stop: 14271, Start Num: 18

Candidate Starts for Erutan\_20:

(13, 13870), (16, 13903), (Start: 18 @13918 has 29 MA's), (27, 13984), (35, 14041), (39, 14101), (42, 14131), (48, 14197), (49, 14203), (51, 14212), (57, 14236),

Gene: Fulcrum\_21 Start: 14451, Stop: 14804, Start Num: 18

Candidate Starts for Fulcrum\_21:

(16, 14436), (Start: 18 @14451 has 29 MA's), (27, 14517), (35, 14574), (39, 14634), (42, 14664), (48, 14730), (49, 14736), (51, 14745), (57, 14769),

Gene: GOATification\_21 Start: 14451, Stop: 14804, Start Num: 18

Candidate Starts for GOATification\_21:

(16, 14436), (Start: 18 @14451 has 29 MA's), (27, 14517), (35, 14574), (39, 14634), (42, 14664), (48, 14730), (49, 14736), (51, 14745), (57, 14769),

Gene: Genamy16\_19 Start: 12025, Stop: 12378, Start Num: 18

Candidate Starts for Genamy16\_19:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: Gibbin\_21 Start: 14511, Stop: 14864, Start Num: 18

Candidate Starts for Gibbin\_21:

(13, 14463), (16, 14496), (Start: 18 @14511 has 29 MA's), (27, 14577), (35, 14634), (39, 14694), (42, 14724), (48, 14790), (49, 14796), (51, 14805), (57, 14829),

Gene: Giuseppe\_20 Start: 13181, Stop: 13543, Start Num: 17

Candidate Starts for Giuseppe\_20:

(12, 13130), (Start: 14 @13151 has 1 MA's), (Start: 17 @13181 has 42 MA's), (23, 13229), (25, 13238), (Start: 30 @13262 has 1 MA's), (35, 13307), (37, 13358), (39, 13367), (43, 13403), (45, 13418), (49, 13472), (56, 13502),

Gene: Gretellyn\_20 Start: 14785, Stop: 15138, Start Num: 18

Candidate Starts for Gretellyn\_20:

(13, 14737), (16, 14770), (Start: 18 @14785 has 29 MA's), (27, 14851), (35, 14908), (39, 14968), (42, 14998), (48, 15064), (49, 15070), (51, 15079), (57, 15103),

Gene: Gumball\_19 Start: 13139, Stop: 13501, Start Num: 17

Candidate Starts for Gumball\_19:

(12, 13088), (Start: 14 @13109 has 1 MA's), (Start: 17 @13139 has 42 MA's), (23, 13187), (25, 13196), (Start: 30 @13220 has 1 MA's), (35, 13265), (37, 13316), (39, 13325), (43, 13361), (45, 13376), (49, 13430), (56, 13460),

Gene: Hawkeye\_22 Start: 13075, Stop: 13449, Start Num: 17

Candidate Starts for Hawkeye\_22:

(Start: 17 @13075 has 42 MA's), (32, 13168), (35, 13201), (37, 13252), (43, 13297), (45, 13312), (49, 13366), (55, 13393), (57, 13399), (62, 13438),

Gene: Helpful\_21 Start: 13189, Stop: 13551, Start Num: 17

Candidate Starts for Helpful\_21:

(12, 13138), (Start: 14 @13159 has 1 MA's), (Start: 17 @13189 has 42 MA's), (23, 13237), (25, 13246), (Start: 30 @13270 has 1 MA's), (35, 13315), (37, 13366), (39, 13375), (43, 13411), (45, 13426), (49, 13480), (56, 13510),

Gene: Jalebi\_20 Start: 14961, Stop: 15314, Start Num: 18

Candidate Starts for Jalebi\_20:

(13, 14913), (16, 14946), (Start: 18 @14961 has 29 MA's), (27, 15027), (35, 15084), (39, 15144), (42, 15174), (48, 15240), (49, 15246), (51, 15255), (57, 15279),

Gene: Jamemuya19\_17 Start: 12025, Stop: 12378, Start Num: 18

Candidate Starts for Jamemuya19\_17:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: KandZ\_20 Start: 13289, Stop: 13651, Start Num: 17



Candidate Starts for KandZ\_20:

(12, 13238), (Start: 14 @13259 has 1 MA's), (Start: 17 @13289 has 42 MA's), (23, 13337), (25, 13346), (Start: 30 @13370 has 1 MA's), (35, 13415), (37, 13466), (39, 13475), (43, 13511), (45, 13526), (49, 13580), (56, 13610),

Gene: Konstantine\_24 Start: 14203, Stop: 14565, Start Num: 17

Candidate Starts for Konstantine\_24:

(Start: 17 @14203 has 42 MA's), (22, 14248), (Start: 26 @14269 has 1 MA's), (35, 14338), (39, 14398), (41, 14419), (51, 14509), (53, 14515), (57, 14533), (58, 14542), (60, 14554),

Gene: Labelle\_26 Start: 16380, Stop: 16748, Start Num: 17

Candidate Starts for Labelle\_26:

(Start: 17 @16380 has 42 MA's), (44, 16602), (50, 16674), (51, 16677), (57, 16701), (59, 16719), (61, 16731),

Gene: Lambo\_20 Start: 14455, Stop: 14808, Start Num: 18

Candidate Starts for Lambo\_20:

(13, 14407), (16, 14440), (Start: 18 @14455 has 29 MA's), (27, 14521), (35, 14578), (39, 14638), (42, 14668), (48, 14734), (49, 14740), (51, 14749), (57, 14773),

Gene: Lila22\_20 Start: 14409, Stop: 14762, Start Num: 18

Candidate Starts for Lila22\_20:

(16, 14394), (Start: 18 @14409 has 29 MA's), (27, 14475), (35, 14532), (39, 14592), (42, 14622), (48, 14688), (49, 14694), (51, 14703), (57, 14727),

Gene: LilyPad\_16 Start: 10238, Stop: 10588, Start Num: 17

Candidate Starts for LilyPad\_16:

(10, 10166), (Start: 17 @10238 has 42 MA's), (29, 10316), (35, 10364), (45, 10475), (49, 10529), (51, 10538), (57, 10562),

Gene: LittleFella\_17 Start: 12130, Stop: 12480, Start Num: 17

Candidate Starts for LittleFella\_17:

(4, 12022), (13, 12085), (Start: 17 @12130 has 42 MA's), (29, 12208), (32, 12223), (35, 12256), (39, 12316), (49, 12418), (51, 12427), (57, 12451),

Gene: LuckyLeo\_19 Start: 13740, Stop: 14093, Start Num: 18

Candidate Starts for LuckyLeo\_19:

(2, 13614), (5, 13632), (6, 13635), (7, 13650), (16, 13725), (Start: 18 @13740 has 29 MA's), (34, 13836), (35, 13863), (37, 13914), (39, 13923), (42, 13953), (49, 14025), (51, 14034), (57, 14058),

Gene: Madi\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for Madi\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: Madruga\_25 Start: 16049, Stop: 16417, Start Num: 17

Candidate Starts for Madruga\_25:

(Start: 17 @16049 has 42 MA's), (20, 16064), (38, 16229), (44, 16271), (50, 16343), (51, 16346), (57, 16370), (59, 16388), (61, 16400),

Gene: Megatron06\_21 Start: 13536, Stop: 13898, Start Num: 17

Candidate Starts for Megatron06\_21:

(Start: 17 @13536 has 42 MA's), (22, 13581), (Start: 26 @13602 has 1 MA's), (35, 13671), (39, 13731), (51, 13842), (53, 13848), (57, 13866), (58, 13875), (60, 13887),

Gene: Mima20\_19 Start: 14138, Stop: 14491, Start Num: 18

Candidate Starts for Mima20\_19:

(13, 14090), (16, 14123), (Start: 18 @14138 has 29 MA's), (27, 14204), (35, 14261), (39, 14321), (42, 14351), (48, 14417), (49, 14423), (51, 14432), (57, 14456),

Gene: MoiGyank\_22 Start: 14822, Stop: 15175, Start Num: 18

Candidate Starts for MoiGyank\_22:

(16, 14807), (Start: 18 @14822 has 29 MA's), (27, 14888), (35, 14945), (39, 15005), (42, 15035), (48, 15101), (49, 15107), (51, 15116), (57, 15140),

Gene: Mopey\_20 Start: 13189, Stop: 13551, Start Num: 17

Candidate Starts for Mopey\_20:

(12, 13138), (Start: 14 @13159 has 1 MA's), (Start: 17 @13189 has 42 MA's), (23, 13237), (25, 13246), (Start: 30 @13270 has 1 MA's), (35, 13315), (37, 13366), (39, 13375), (43, 13411), (45, 13426), (49, 13480), (56, 13510),

Gene: NorManre\_21 Start: 14017, Stop: 14370, Start Num: 18

Candidate Starts for NorManre\_21:

(Start: 18 @14017 has 29 MA's), (27, 14083), (35, 14140), (39, 14200), (42, 14230), (48, 14296), (49, 14302), (51, 14311), (57, 14335),

Gene: Nova\_20 Start: 13616, Stop: 13978, Start Num: 17

Candidate Starts for Nova\_20:

(12, 13565), (Start: 14 @13586 has 1 MA's), (Start: 17 @13616 has 42 MA's), (23, 13664), (25, 13673), (Start: 30 @13697 has 1 MA's), (35, 13742), (37, 13793), (39, 13802), (43, 13838), (45, 13853), (49, 13907), (56, 13937),

Gene: NovaSharks\_19 Start: 12025, Stop: 12378, Start Num: 18

Candidate Starts for NovaSharks\_19:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: Oaker\_19 Start: 13260, Stop: 13622, Start Num: 17

Candidate Starts for Oaker\_19:

(Start: 17 @13260 has 42 MA's), (22, 13305), (Start: 26 @13326 has 1 MA's), (35, 13395), (39, 13455), (41, 13476), (46, 13521), (51, 13566), (53, 13572), (57, 13590), (58, 13599), (60, 13611),

Gene: OtterstedtS21\_20 Start: 14107, Stop: 14460, Start Num: 18

Candidate Starts for OtterstedtS21\_20:

(13, 14059), (16, 14092), (Start: 18 @14107 has 29 MA's), (27, 14173), (35, 14230), (39, 14290), (42, 14320), (48, 14386), (49, 14392), (51, 14401), (57, 14425),

Gene: PBI1\_21 Start: 13201, Stop: 13482, Start Num: 30

Candidate Starts for PBI1\_21:

(12, 13069), (Start: 14 @13090 has 1 MA's), (Start: 17 @13120 has 42 MA's), (23, 13168), (25, 13177), (Start: 30 @13201 has 1 MA's), (35, 13246), (37, 13297), (39, 13306), (43, 13342), (45, 13357), (49, 13411), (56, 13441),

Gene: PLOT\_21 Start: 13192, Stop: 13554, Start Num: 17

Candidate Starts for PLOT\_21:

(12, 13141), (Start: 14 @13162 has 1 MA's), (Start: 17 @13192 has 42 MA's), (23, 13240), (25, 13249), (Start: 30 @13273 has 1 MA's), (35, 13318), (37, 13369), (39, 13378), (43, 13414), (45, 13429), (49, 13483), (56, 13513),

Gene: ParvusTarda\_20 Start: 13589, Stop: 13942, Start Num: 18

Candidate Starts for ParvusTarda\_20:

(13, 13541), (16, 13574), (Start: 18 @13589 has 29 MA's), (27, 13655), (35, 13712), (39, 13772), (42, 13802), (48, 13868), (49, 13874), (51, 13883), (57, 13907),

Gene: Patience\_27 Start: 16939, Stop: 17307, Start Num: 17

Candidate Starts for Patience\_27:

(Start: 17 @16939 has 42 MA's), (38, 17119), (44, 17161), (50, 17233), (51, 17236), (57, 17260), (59, 17278), (61, 17290),

Gene: Patos\_21 Start: 14017, Stop: 14370, Start Num: 18

Candidate Starts for Patos\_21:

(Start: 18 @14017 has 29 MA's), (27, 14083), (35, 14140), (39, 14200), (42, 14230), (48, 14296), (49, 14302), (51, 14311), (57, 14335),

Gene: Penelope2018\_20 Start: 13189, Stop: 13551, Start Num: 17

Candidate Starts for Penelope2018\_20:

(12, 13138), (Start: 14 @13159 has 1 MA's), (Start: 17 @13189 has 42 MA's), (23, 13237), (25, 13246), (Start: 30 @13270 has 1 MA's), (35, 13315), (37, 13366), (39, 13375), (43, 13411), (45, 13426), (49, 13480), (56, 13510),

Gene: Phreeze\_19 Start: 13067, Stop: 13363, Start Num: 26

Candidate Starts for Phreeze\_19:

(Start: 17 @13001 has 42 MA's), (22, 13046), (Start: 26 @13067 has 1 MA's), (35, 13136), (39, 13196), (51, 13307), (53, 13313), (57, 13331), (58, 13340), (60, 13352),

Gene: Prager\_20 Start: 13201, Stop: 13563, Start Num: 17

Candidate Starts for Prager\_20:

(12, 13150), (Start: 14 @13171 has 1 MA's), (Start: 17 @13201 has 42 MA's), (23, 13249), (25, 13258), (Start: 30 @13282 has 1 MA's), (35, 13327), (37, 13378), (39, 13387), (43, 13423), (45, 13438), (49, 13492), (56, 13522),

Gene: Predator\_23 Start: 14526, Stop: 14885, Start Num: 17

Candidate Starts for Predator\_23:

(Start: 17 @14526 has 42 MA's), (21, 14562), (22, 14571), (24, 14583), (Start: 30 @14616 has 1 MA's), (32, 14628), (35, 14661), (41, 14742), (47, 14793), (51, 14832), (53, 14838), (57, 14856), (60, 14877),

Gene: Puissant\_18 Start: 13472, Stop: 13816, Start Num: 20

Candidate Starts for Puissant\_18:

(Start: 17 @13457 has 42 MA's), (20, 13472), (22, 13502), (Start: 26 @13523 has 1 MA's), (32, 13559), (35, 13592), (41, 13673), (44, 13688), (52, 13766), (53, 13769), (57, 13787), (58, 13796), (60, 13808),

Gene: Ranch\_20 Start: 12955, Stop: 13308, Start Num: 18

Candidate Starts for Ranch\_20:

(13, 12907), (16, 12940), (Start: 18 @12955 has 29 MA's), (27, 13021), (35, 13078), (39, 13138), (42, 13168), (48, 13234), (49, 13240), (51, 13249), (57, 13273),

Gene: Rumi\_19 Start: 12025, Stop: 12378, Start Num: 18

Candidate Starts for Rumi\_19:

(13, 11977), (16, 12010), (Start: 18 @12025 has 29 MA's), (27, 12091), (35, 12148), (39, 12208), (42, 12238), (48, 12304), (49, 12310), (51, 12319), (57, 12343),

Gene: Sadboi\_20 Start: 14785, Stop: 15138, Start Num: 18

Candidate Starts for Sadboi\_20:

(13, 14737), (16, 14770), (Start: 18 @14785 has 29 MA's), (27, 14851), (35, 14908), (39, 14968), (42, 14998), (48, 15064), (49, 15070), (51, 15079), (57, 15103),

Gene: Sampudon\_20 Start: 14961, Stop: 15314, Start Num: 18

Candidate Starts for Sampudon\_20:

(13, 14913), (16, 14946), (Start: 18 @14961 has 29 MA's), (27, 15027), (35, 15084), (39, 15144), (42, 15174), (48, 15240), (49, 15246), (51, 15255), (57, 15279),

Gene: Sienna\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for Sienna\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: SirHarley\_19 Start: 13121, Stop: 13483, Start Num: 17

Candidate Starts for SirHarley\_19:

(12, 13070), (Start: 14 @13091 has 1 MA's), (Start: 17 @13121 has 42 MA's), (23, 13169), (25, 13178), (Start: 30 @13202 has 1 MA's), (35, 13247), (37, 13298), (39, 13307), (43, 13343), (45, 13358), (49, 13412), (56, 13442),

Gene: Suzy\_16 Start: 10717, Stop: 11097, Start Num: 14

Candidate Starts for Suzy\_16:

(Start: 14 @10717 has 1 MA's), (Start: 17 @10747 has 42 MA's), (19, 10756), (23, 10795), (29, 10825), (35, 10873), (40, 10936), (49, 11038), (57, 11071),

Gene: Terapin\_15 Start: 9519, Stop: 9869, Start Num: 17

Candidate Starts for Terapin\_15:

(Start: 17 @9519 has 42 MA's), (19, 9528), (23, 9567), (29, 9597), (35, 9645), (40, 9708), (49, 9810), (51, 9819), (57, 9843),

Gene: Thoth\_20 Start: 13186, Stop: 13548, Start Num: 17

Candidate Starts for Thoth\_20:

(12, 13135), (Start: 14 @13156 has 1 MA's), (15, 13165), (Start: 17 @13186 has 42 MA's), (23, 13234), (25, 13243), (Start: 30 @13267 has 1 MA's), (35, 13312), (37, 13363), (39, 13372), (43, 13408), (45, 13423), (49, 13477), (56, 13507),

Gene: Thumb\_19 Start: 13002, Stop: 13364, Start Num: 17

Candidate Starts for Thumb\_19:

(Start: 17 @13002 has 42 MA's), (22, 13047), (Start: 26 @13068 has 1 MA's), (35, 13137), (39, 13197), (51, 13308), (53, 13314), (57, 13332), (58, 13341), (60, 13353),

Gene: Tillicus\_20 Start: 13319, Stop: 13687, Start Num: 16

Candidate Starts for Tillicus\_20:

(13, 13286), (16, 13319), (Start: 18 @13334 has 29 MA's), (34, 13430), (35, 13457), (37, 13508), (39, 13517), (42, 13547), (49, 13619), (51, 13628), (57, 13652),

Gene: Troll4\_20 Start: 13190, Stop: 13552, Start Num: 17

Candidate Starts for Troll4\_20:

(12, 13139), (Start: 14 @13160 has 1 MA's), (Start: 17 @13190 has 42 MA's), (23, 13238), (25, 13247), (Start: 30 @13271 has 1 MA's), (35, 13316), (37, 13367), (39, 13376), (43, 13412), (45, 13427), (49, 13481), (56, 13511),

Gene: Visconti\_20 Start: 13199, Stop: 13561, Start Num: 17

Candidate Starts for Visconti\_20:

(12, 13148), (Start: 14 @13169 has 1 MA's), (15, 13178), (Start: 17 @13199 has 42 MA's), (23, 13247), (25, 13256), (Start: 30 @13280 has 1 MA's), (35, 13325), (37, 13376), (39, 13385), (43, 13421), (45, 13436), (49, 13490), (56, 13520),

Gene: WaldoWhy\_21 Start: 13195, Stop: 13557, Start Num: 17

Candidate Starts for WaldoWhy\_21:

(12, 13144), (Start: 14 @13165 has 1 MA's), (Start: 17 @13195 has 42 MA's), (23, 13243), (25, 13252), (Start: 30 @13276 has 1 MA's), (35, 13321), (37, 13372), (39, 13381), (43, 13417), (45, 13432), (49, 13486), (56, 13516),

Gene: Wojtek\_19 Start: 13662, Stop: 14015, Start Num: 18

Candidate Starts for Wojtek\_19:

(13, 13614), (16, 13647), (Start: 18 @13662 has 29 MA's), (27, 13728), (35, 13785), (39, 13845), (42, 13875), (48, 13941), (49, 13947), (51, 13956), (57, 13980),

Gene: Xenia2\_17 Start: 13689, Stop: 14057, Start Num: 16

Candidate Starts for Xenia2\_17:

(1, 13569), (3, 13590), (8, 13617), (9, 13620), (11, 13638), (16, 13689), (Start: 18 @13704 has 29 MA's), (35, 13827), (42, 13917), (45, 13935), (49, 13989), (57, 14022), (60, 14043),

Gene: Yikes\_21 Start: 15046, Stop: 15399, Start Num: 18

Candidate Starts for Yikes\_21:

(13, 14998), (16, 15031), (Start: 18 @15046 has 29 MA's), (27, 15112), (35, 15169), (39, 15229), (42, 15259), (48, 15325), (49, 15331), (51, 15340), (57, 15364),

Gene: Zany\_19 Start: 14175, Stop: 14528, Start Num: 18

Candidate Starts for Zany\_19:

(13, 14127), (16, 14160), (Start: 18 @14175 has 29 MA's), (27, 14241), (31, 14259), (35, 14298), (39, 14358), (42, 14388), (48, 14454), (49, 14460), (51, 14469), (57, 14493),