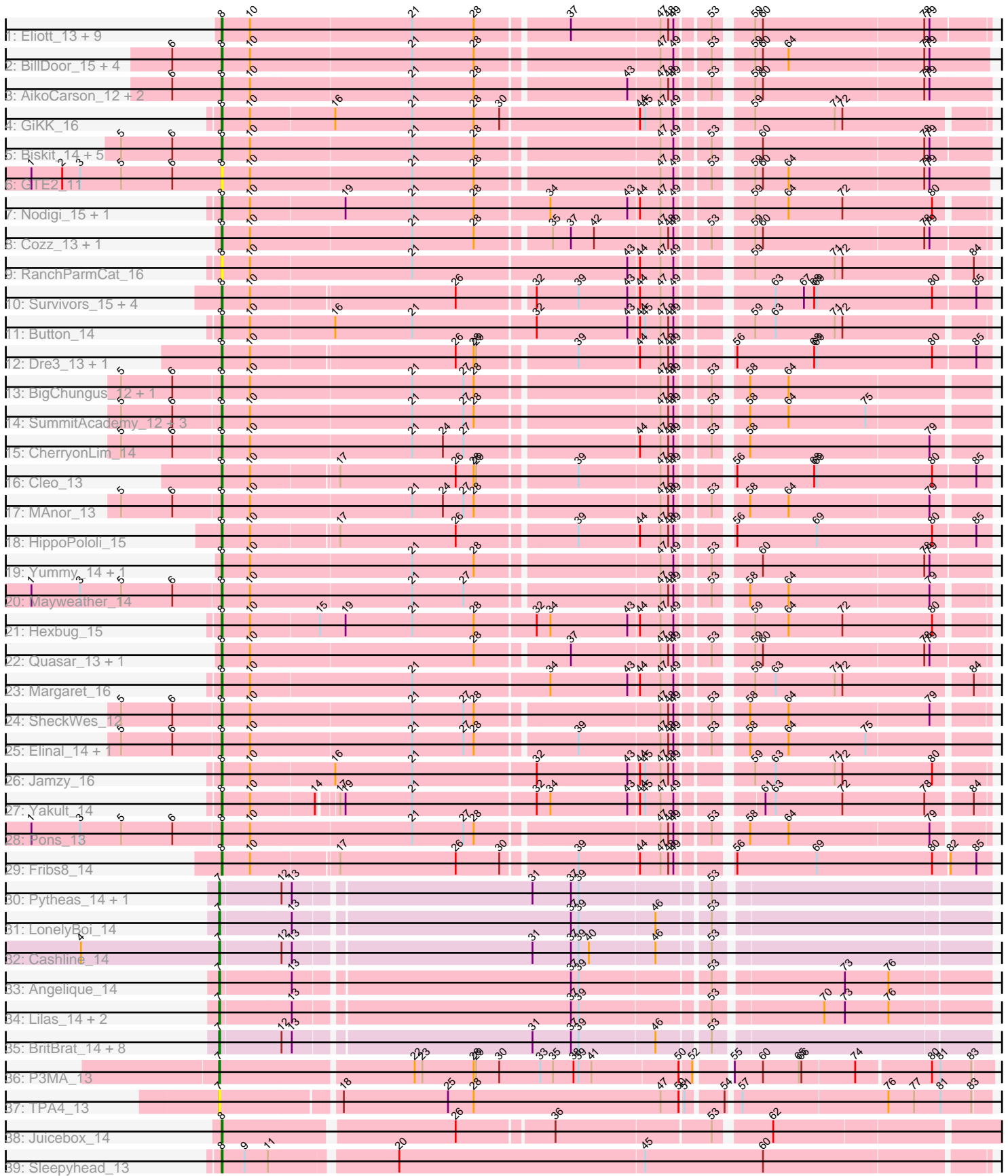


Pham 192498



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 192498 Report

This analysis was run 11/02/24 on database version 579.

Pham number 192498 has 84 members, 11 are drafts.

Phages represented in each track:

- Track 1 : Elliott\_13, Agatha\_13, GoldHunter\_14, MunkgeeRoachy\_13, PsychoKiller\_13, Typhonmarchy\_14, RedBaron\_14, Carsonalex\_14, Sopespian\_13, Burnsey\_13
- Track 2 : BillDoor\_15, Yarn\_12, SteamedHams\_15, Tolls\_15, AndPeggy\_12
- Track 3 : AikoCarson\_12, Amok\_12, Emalyn\_12
- Track 4 : GiKK\_16
- Track 5 : Biskit\_14, Buttrmlkdreams\_13, Troje\_13, SweatNTears\_15, MScarn\_15, SketchMex\_12
- Track 6 : GTE2\_11
- Track 7 : Nodigi\_15, Orla\_15
- Track 8 : Cozz\_13, Axym\_13
- Track 9 : RanchParmCat\_16
- Track 10 : Survivors\_15, Azira\_15, Nibbles\_15, Zareef\_17, MaVan\_15
- Track 11 : Button\_14
- Track 12 : Dre3\_13, Gibbous\_13
- Track 13 : BigChungus\_12, Feastonyeet\_12
- Track 14 : SummitAcademy\_12, Lauer\_12, PotPie\_13, Vine\_14
- Track 15 : CherryonLim\_14
- Track 16 : Cleo\_13
- Track 17 : MAnor\_13
- Track 18 : HippoPololi\_15
- Track 19 : Yummy\_14, Horseradish\_14
- Track 20 : Mayweather\_14
- Track 21 : Hexbug\_15
- Track 22 : Quasar\_13, Nina\_14
- Track 23 : Margaret\_16
- Track 24 : SheckWes\_12
- Track 25 : Elinal\_14, KayGee\_13
- Track 26 : Jamzy\_16
- Track 27 : Yakult\_14
- Track 28 : Pons\_13
- Track 29 : Fribs8\_14
- Track 30 : Pytheas\_14, Jablanski\_14
- Track 31 : LonelyBoi\_14
- Track 32 : Cashline\_14
- Track 33 : Angelique\_14
- Track 34 : Lilas\_14, Bradissa\_14, EnalisNailo\_14

- Track 35 : BritBrat\_14, Posh\_14, Wrigley\_14, Pollux\_14, Floral\_14, Marteena\_14, EMSquaredA\_14, Confidence\_14, BeeGee\_14
- Track 36 : P3MA\_13
- Track 37 : TPA4\_13
- Track 38 : Juicebox\_14
- Track 39 : Sleepyhead\_13

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

The start number called the most often in the published annotations is 8, it was called in 55 of the 73 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Agatha\_13, AikoCarson\_12, Amok\_12, AndPeggy\_12, Axym\_13, Azira\_15, BigChungus\_12, BillDoor\_15, Biskit\_14, Burnsey\_13, Button\_14, Buttrmilkdreams\_13, Carsonalex\_14, CherryonLim\_14, Cleo\_13, Cozz\_13, Dre3\_13, Elinal\_14, Elliott\_13, Emalyn\_12, Feastonyeet\_12, Fribs8\_14, GTE2\_11, GiKK\_16, Gibbous\_13, GoldHunter\_14, Hexbug\_15, HippoPololi\_15, Horseradish\_14, Jamzy\_16, Juicebox\_14, KayGee\_13, Lauer\_12, MAnor\_13, MScarn\_15, MaVan\_15, Margaret\_16, Mayweather\_14, MunkgeeRoachy\_13, Nibbles\_15, Nina\_14, Nodigi\_15, Orla\_15, Pons\_13, PotPie\_13, PsychoKiller\_13, Quasar\_13, RanchParmCat\_16, RedBaron\_14, SheckWes\_12, SketchMex\_12, Sleepyhead\_13, Sopespian\_13, SteamedHams\_15, SummitAcademy\_12, Survivors\_15, SweatNTears\_15, Tolls\_15, Troje\_13, Typhonomachy\_14, Vine\_14, Yakult\_14, Yarn\_12, Yummy\_14, Zareef\_17,

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

- 

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

- Angelique\_14, BeeGee\_14, Bradissa\_14, BritBrat\_14, Cashline\_14, Confidence\_14, EMSquaredA\_14, EnalisNailo\_14, Floral\_14, Jablanski\_14, Lilas\_14, LonelyBoi\_14, Marteena\_14, P3MA\_13, Pollux\_14, Posh\_14, Pytheas\_14, TPA4\_13, Wrigley\_14,

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

Start 7:

- Found in 19 of 84 ( 22.6% ) of genes in pham
- Manual Annotations of this start: 18 of 73
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Angelique\_14 (CY1), BeeGee\_14 (CY), Bradissa\_14 (CY1), BritBrat\_14 (CY2), Cashline\_14 (CY), Confidence\_14 (CY1), EMSquaredA\_14 (CY1), EnalisNailo\_14 (CY1), Floral\_14 (CY1), Jablanski\_14 (CY), Lilas\_14 (CY1), LonelyBoi\_14 (CY), Marteena\_14 (CY1), P3MA\_13 (singleton), Pollux\_14 (CY1), Posh\_14 (CY), Pytheas\_14 (CY), TPA4\_13 (singleton), Wrigley\_14 (CY),

Start 8:

- Found in 65 of 84 ( 77.4% ) of genes in pham
- Manual Annotations of this start: 55 of 73

- Called 100.0% of time when present
- Phage (with cluster) where this start called: Agatha\_13 (CT), AikoCarson\_12 (CT), Amok\_12 (CT), AndPeggy\_12 (CT), Axym\_13 (CT), Azira\_15 (CT), BigChungus\_12 (CT), BillDoor\_15 (CT), Biskit\_14 (CT), Burnsey\_13 (CT), Button\_14 (CT), Buttrmlkdreams\_13 (CT), Carsonalex\_14 (CT), CherryonLim\_14 (CT), Cleo\_13 (CT), Cozz\_13 (CT), Dre3\_13 (CT), Elinal\_14 (CT), Elliott\_13 (CT), Emalyn\_12 (CT), Feastonyeet\_12 (CT), Fribs8\_14 (CT), GTE2\_11 (CT), GiKK\_16 (CT), Gibbous\_13 (CT), GoldHunter\_14 (CT), Hexbug\_15 (CT), HippoPololi\_15 (CT), Horseradish\_14 (CT), Jamzy\_16 (CT), Juicebox\_14 (singleton), KayGee\_13 (CT), Lauer\_12 (CT), MAAnor\_13 (CT), MScarn\_15 (CT), MaVan\_15 (CT), Margaret\_16 (CT), Mayweather\_14 (CT), MunkgeeRoachy\_13 (CT), Nibbles\_15 (CT), Nina\_14 (CT), Nodigi\_15 (CT), Orla\_15 (CT), Pons\_13 (CT), PotPie\_13 (CT), PsychoKiller\_13 (CT), Quasar\_13 (CT), RanchParmCat\_16 (CT), RedBaron\_14 (CT), SheckWes\_12 (CT), SketchMex\_12 (CT), Sleepyhead\_13 (singleton), Sopeopian\_13 (CT), SteamedHams\_15 (CT), SummitAcademy\_12 (CT), Survivors\_15 (CT), SweatNTears\_15 (CT), Tolls\_15 (CT), Troje\_13 (CT), Typhonmarchy\_14 (CT), Vine\_14 (CT), Yakult\_14 (CT), Yarn\_12 (CT), Yummy\_14 (CT), Zareef\_17 (CT),

### Summary by clusters:

There are 5 clusters represented in this pham: CY1, CY2, CY, singleton, CT,

Info for manual annotations of cluster CT:

- Start number 8 was manually annotated 53 times for cluster CT.

Info for manual annotations of cluster CY:

- Start number 7 was manually annotated 7 times for cluster CY.

Info for manual annotations of cluster CY1:

- Start number 7 was manually annotated 9 times for cluster CY1.

Info for manual annotations of cluster CY2:

- Start number 7 was manually annotated 1 time for cluster CY2.

### Gene Information:

Gene: Agatha\_13 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for Agatha\_13:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (37, 8329), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: AikoCarson\_12 Start: 7662, Stop: 8510, Start Num: 8

Candidate Starts for AikoCarson\_12:

(6, 7605), (Start: 8 @7662 has 55 MA's), (10, 7695), (21, 7881), (28, 7953), (43, 8118), (47, 8154), (48, 8163), (49, 8169), (53, 8202), (59, 8238), (60, 8247), (78, 8433), (79, 8439),

Gene: Amok\_12 Start: 7662, Stop: 8510, Start Num: 8

Candidate Starts for Amok\_12:

(6, 7605), (Start: 8 @7662 has 55 MA's), (10, 7695), (21, 7881), (28, 7953), (43, 8118), (47, 8154), (48, 8163), (49, 8169), (53, 8202), (59, 8238), (60, 8247), (78, 8433), (79, 8439),

Gene: AndPeggy\_12 Start: 7953, Stop: 8798, Start Num: 8

Candidate Starts for AndPeggy\_12:

(6, 7896), (Start: 8 @7953 has 55 MA's), (10, 7986), (21, 8172), (28, 8244), (47, 8445), (49, 8460), (53, 8493), (59, 8529), (60, 8538), (64, 8568), (78, 8724), (79, 8730),

Gene: Angelique\_14 Start: 8715, Stop: 9560, Start Num: 7

Candidate Starts for Angelique\_14:

(Start: 7 @8715 has 18 MA's), (13, 8796), (37, 9105), (39, 9114), (53, 9255), (73, 9396), (76, 9447),

Gene: Axym\_13 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for Axym\_13:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (35, 8308), (37, 8329), (42, 8356), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: Azira\_15 Start: 8878, Stop: 9717, Start Num: 8

Candidate Starts for Azira\_15:

(Start: 8 @8878 has 55 MA's), (10, 8911), (26, 9139), (32, 9220), (39, 9268), (43, 9325), (44, 9337), (47, 9361), (49, 9376), (63, 9469), (67, 9502), (68, 9514), (69, 9517), (80, 9652), (85, 9700),

Gene: BeeGee\_14 Start: 8711, Stop: 9556, Start Num: 7

Candidate Starts for BeeGee\_14:

(Start: 7 @8711 has 18 MA's), (12, 8780), (13, 8792), (31, 9056), (37, 9101), (39, 9110), (46, 9197), (53, 9251),

Gene: BigChungus\_12 Start: 7726, Stop: 8565, Start Num: 8

Candidate Starts for BigChungus\_12:

(5, 7612), (6, 7672), (Start: 8 @7726 has 55 MA's), (10, 7759), (21, 7945), (27, 8005), (28, 8017), (47, 8218), (48, 8227), (49, 8233), (53, 8266), (58, 8296), (64, 8341),

Gene: BillDoor\_15 Start: 7918, Stop: 8763, Start Num: 8

Candidate Starts for BillDoor\_15:

(6, 7861), (Start: 8 @7918 has 55 MA's), (10, 7951), (21, 8137), (28, 8209), (47, 8410), (49, 8425), (53, 8458), (59, 8494), (60, 8503), (64, 8533), (78, 8689), (79, 8695),

Gene: Biskit\_14 Start: 7925, Stop: 8770, Start Num: 8

Candidate Starts for Biskit\_14:

(5, 7808), (6, 7868), (Start: 8 @7925 has 55 MA's), (10, 7958), (21, 8144), (28, 8216), (47, 8417), (49, 8432), (53, 8465), (60, 8510), (78, 8696), (79, 8702),

Gene: Bradissa\_14 Start: 8715, Stop: 9560, Start Num: 7

Candidate Starts for Bradissa\_14:

(Start: 7 @8715 has 18 MA's), (13, 8796), (37, 9105), (39, 9114), (53, 9255), (70, 9372), (73, 9396), (76, 9447),

Gene: BritBrat\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for BritBrat\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: Burnsey\_13 Start: 7940, Stop: 8782, Start Num: 8

Candidate Starts for Burnsey\_13:

(Start: 8 @7940 has 55 MA's), (10, 7973), (21, 8159), (28, 8231), (37, 8330), (47, 8432), (48, 8441), (49, 8447), (53, 8480), (59, 8516), (60, 8525), (78, 8711), (79, 8717),

Gene: Button\_14 Start: 7947, Stop: 8795, Start Num: 8

Candidate Starts for Button\_14:

(Start: 8 @7947 has 55 MA's), (10, 7980), (16, 8076), (21, 8166), (32, 8307), (43, 8412), (44, 8424), (45, 8430), (47, 8448), (48, 8457), (49, 8463), (59, 8532), (63, 8556), (71, 8625), (72, 8634),

Gene: Buttrmlkdreams\_13 Start: 7910, Stop: 8755, Start Num: 8

Candidate Starts for Buttrmlkdreams\_13:

(5, 7793), (6, 7853), (Start: 8 @7910 has 55 MA's), (10, 7943), (21, 8129), (28, 8201), (47, 8402), (49, 8417), (53, 8450), (60, 8495), (78, 8681), (79, 8687),

Gene: Carsonalex\_14 Start: 7996, Stop: 8838, Start Num: 8

Candidate Starts for Carsonalex\_14:

(Start: 8 @7996 has 55 MA's), (10, 8029), (21, 8215), (28, 8287), (37, 8386), (47, 8488), (48, 8497), (49, 8503), (53, 8536), (59, 8572), (60, 8581), (78, 8767), (79, 8773),

Gene: Cashline\_14 Start: 8571, Stop: 9416, Start Num: 7

Candidate Starts for Cashline\_14:

(4, 8409), (Start: 7 @8571 has 18 MA's), (12, 8640), (13, 8652), (31, 8916), (37, 8961), (39, 8970), (40, 8982), (46, 9057), (53, 9111),

Gene: CherryonLim\_14 Start: 8452, Stop: 9291, Start Num: 8

Candidate Starts for CherryonLim\_14:

(5, 8338), (6, 8398), (Start: 8 @8452 has 55 MA's), (10, 8485), (21, 8671), (24, 8707), (27, 8731), (44, 8920), (47, 8944), (48, 8953), (49, 8959), (53, 8992), (58, 9022), (79, 9229),

Gene: Cleo\_13 Start: 8168, Stop: 9007, Start Num: 8

Candidate Starts for Cleo\_13:

(Start: 8 @8168 has 55 MA's), (10, 8201), (17, 8294), (26, 8429), (28, 8450), (29, 8453), (39, 8558), (47, 8651), (48, 8660), (49, 8666), (56, 8714), (68, 8804), (69, 8807), (80, 8942), (85, 8990),

Gene: Confidence\_14 Start: 8711, Stop: 9556, Start Num: 7

Candidate Starts for Confidence\_14:

(Start: 7 @8711 has 18 MA's), (12, 8780), (13, 8792), (31, 9056), (37, 9101), (39, 9110), (46, 9197), (53, 9251),

Gene: Cozz\_13 Start: 7940, Stop: 8782, Start Num: 8

Candidate Starts for Cozz\_13:

(Start: 8 @7940 has 55 MA's), (10, 7973), (21, 8159), (28, 8231), (35, 8309), (37, 8330), (42, 8357), (47, 8432), (48, 8441), (49, 8447), (53, 8480), (59, 8516), (60, 8525), (78, 8711), (79, 8717),

Gene: Dre3\_13 Start: 8115, Stop: 8954, Start Num: 8

Candidate Starts for Dre3\_13:

(Start: 8 @8115 has 55 MA's), (10, 8148), (26, 8376), (28, 8397), (29, 8400), (39, 8505), (44, 8574), (47, 8598), (48, 8607), (49, 8613), (56, 8661), (68, 8751), (69, 8754), (80, 8889), (85, 8937),

Gene: EMSquaredA\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for EMSquaredA\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: Elinal\_14 Start: 7707, Stop: 8546, Start Num: 8

Candidate Starts for Elinal\_14:

(5, 7593), (6, 7653), (Start: 8 @7707 has 55 MA's), (10, 7740), (21, 7926), (27, 7986), (28, 7998), (39, 8106), (47, 8199), (48, 8208), (49, 8214), (53, 8247), (58, 8277), (64, 8322), (75, 8412),

Gene: Elliott\_13 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for Elliott\_13:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (37, 8329), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: Emalyn\_12 Start: 7661, Stop: 8509, Start Num: 8

Candidate Starts for Emalyn\_12:

(6, 7604), (Start: 8 @7661 has 55 MA's), (10, 7694), (21, 7880), (28, 7952), (43, 8117), (47, 8153), (48, 8162), (49, 8168), (53, 8201), (59, 8237), (60, 8246), (78, 8432), (79, 8438),

Gene: EnalisNailo\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for EnalisNailo\_14:

(Start: 7 @8717 has 18 MA's), (13, 8798), (37, 9107), (39, 9116), (53, 9257), (70, 9374), (73, 9398), (76, 9449),

Gene: Feastonyeet\_12 Start: 7726, Stop: 8565, Start Num: 8

Candidate Starts for Feastonyeet\_12:

(5, 7612), (6, 7672), (Start: 8 @7726 has 55 MA's), (10, 7759), (21, 7945), (27, 8005), (28, 8017), (47, 8218), (48, 8227), (49, 8233), (53, 8266), (58, 8296), (64, 8341),

Gene: Floral\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for Floral\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: Fribs8\_14 Start: 8691, Stop: 9530, Start Num: 8

Candidate Starts for Fribs8\_14:

(Start: 8 @8691 has 55 MA's), (10, 8724), (17, 8817), (26, 8952), (30, 9003), (39, 9081), (44, 9150), (47, 9174), (48, 9183), (49, 9189), (56, 9237), (69, 9330), (80, 9465), (82, 9483), (85, 9513),

Gene: GTE2\_11 Start: 7614, Stop: 8459, Start Num: 8

Candidate Starts for GTE2\_11:

(1, 7392), (2, 7428), (3, 7449), (5, 7497), (6, 7557), (Start: 8 @7614 has 55 MA's), (10, 7647), (21, 7833), (28, 7905), (47, 8106), (49, 8121), (53, 8154), (59, 8190), (60, 8199), (64, 8229), (78, 8385), (79, 8391),

Gene: GiKK\_16 Start: 8250, Stop: 9098, Start Num: 8

Candidate Starts for GiKK\_16:

(Start: 8 @8250 has 55 MA's), (10, 8283), (16, 8379), (21, 8469), (28, 8541), (30, 8571), (44, 8727), (45, 8733), (47, 8751), (49, 8766), (59, 8835), (71, 8928), (72, 8937),

Gene: Gibbous\_13 Start: 8115, Stop: 8954, Start Num: 8

Candidate Starts for Gibbous\_13:

(Start: 8 @8115 has 55 MA's), (10, 8148), (26, 8376), (28, 8397), (29, 8400), (39, 8505), (44, 8574), (47, 8598), (48, 8607), (49, 8613), (56, 8661), (68, 8751), (69, 8754), (80, 8889), (85, 8937),

Gene: GoldHunter\_14 Start: 7940, Stop: 8782, Start Num: 8

Candidate Starts for GoldHunter\_14:

(Start: 8 @7940 has 55 MA's), (10, 7973), (21, 8159), (28, 8231), (37, 8330), (47, 8432), (48, 8441), (49, 8447), (53, 8480), (59, 8516), (60, 8525), (78, 8711), (79, 8717),

Gene: Hexbug\_15 Start: 8936, Stop: 9784, Start Num: 8

Candidate Starts for Hexbug\_15:

(Start: 8 @8936 has 55 MA's), (10, 8969), (15, 9047), (19, 9077), (21, 9155), (28, 9227), (32, 9296), (34, 9311), (43, 9401), (44, 9413), (47, 9437), (49, 9452), (59, 9521), (64, 9560), (72, 9623), (80, 9728),

Gene: HippoPololi\_15 Start: 8768, Stop: 9607, Start Num: 8

Candidate Starts for HippoPololi\_15:

(Start: 8 @8768 has 55 MA's), (10, 8801), (17, 8894), (26, 9029), (39, 9158), (44, 9227), (47, 9251), (48, 9260), (49, 9266), (56, 9314), (69, 9407), (80, 9542), (85, 9590),

Gene: Horseradish\_14 Start: 7821, Stop: 8666, Start Num: 8

Candidate Starts for Horseradish\_14:

(Start: 8 @7821 has 55 MA's), (10, 7854), (21, 8040), (28, 8112), (47, 8313), (49, 8328), (53, 8361), (60, 8406), (78, 8592), (79, 8598),

Gene: Jablanski\_14 Start: 8564, Stop: 9409, Start Num: 7

Candidate Starts for Jablanski\_14:

(Start: 7 @8564 has 18 MA's), (12, 8633), (13, 8645), (31, 8909), (37, 8954), (39, 8963), (53, 9104),

Gene: Jamzy\_16 Start: 8260, Stop: 9108, Start Num: 8

Candidate Starts for Jamzy\_16:

(Start: 8 @8260 has 55 MA's), (10, 8293), (16, 8389), (21, 8479), (32, 8620), (43, 8725), (44, 8737), (45, 8743), (47, 8761), (48, 8770), (49, 8776), (59, 8845), (63, 8869), (71, 8938), (72, 8947), (80, 9052),

Gene: Juicebox\_14 Start: 9288, Stop: 10136, Start Num: 8

Candidate Starts for Juicebox\_14:

(Start: 8 @9288 has 55 MA's), (26, 9543), (36, 9648), (53, 9822), (62, 9879),

Gene: KayGee\_13 Start: 7707, Stop: 8546, Start Num: 8

Candidate Starts for KayGee\_13:

(5, 7593), (6, 7653), (Start: 8 @7707 has 55 MA's), (10, 7740), (21, 7926), (27, 7986), (28, 7998), (39, 8106), (47, 8199), (48, 8208), (49, 8214), (53, 8247), (58, 8277), (64, 8322), (75, 8412),

Gene: Lauer\_12 Start: 7756, Stop: 8595, Start Num: 8

Candidate Starts for Lauer\_12:

(5, 7642), (6, 7702), (Start: 8 @7756 has 55 MA's), (10, 7789), (21, 7975), (27, 8035), (28, 8047), (47, 8248), (48, 8257), (49, 8263), (53, 8296), (58, 8326), (64, 8371), (75, 8461),

Gene: Lilas\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for Lilas\_14:

(Start: 7 @8717 has 18 MA's), (13, 8798), (37, 9107), (39, 9116), (53, 9257), (70, 9374), (73, 9398), (76, 9449),

Gene: LonelyBoi\_14 Start: 8564, Stop: 9409, Start Num: 7

Candidate Starts for LonelyBoi\_14:

(Start: 7 @8564 has 18 MA's), (13, 8645), (37, 8954), (39, 8963), (46, 9050), (53, 9104),

Gene: MAnor\_13 Start: 7697, Stop: 8536, Start Num: 8

Candidate Starts for MAnor\_13:



(5, 7583), (6, 7643), (Start: 8 @7697 has 55 MA's), (10, 7730), (21, 7916), (24, 7952), (27, 7976), (28, 7988), (47, 8189), (48, 8198), (49, 8204), (53, 8237), (58, 8267), (64, 8312), (79, 8474),

Gene: MScarn\_15 Start: 7910, Stop: 8755, Start Num: 8

Candidate Starts for MScarn\_15:

(5, 7793), (6, 7853), (Start: 8 @7910 has 55 MA's), (10, 7943), (21, 8129), (28, 8201), (47, 8402), (49, 8417), (53, 8450), (60, 8495), (78, 8681), (79, 8687),

Gene: MaVan\_15 Start: 8878, Stop: 9717, Start Num: 8

Candidate Starts for MaVan\_15:

(Start: 8 @8878 has 55 MA's), (10, 8911), (26, 9139), (32, 9220), (39, 9268), (43, 9325), (44, 9337), (47, 9361), (49, 9376), (63, 9469), (67, 9502), (68, 9514), (69, 9517), (80, 9652), (85, 9700),

Gene: Margaret\_16 Start: 8645, Stop: 9493, Start Num: 8

Candidate Starts for Margaret\_16:

(Start: 8 @8645 has 55 MA's), (10, 8678), (21, 8864), (34, 9020), (43, 9110), (44, 9122), (47, 9146), (49, 9161), (59, 9230), (63, 9254), (71, 9323), (72, 9332), (84, 9476),

Gene: Marteena\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for Marteena\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: Mayweather\_14 Start: 8330, Stop: 9166, Start Num: 8

Candidate Starts for Mayweather\_14:

(1, 8111), (3, 8168), (5, 8216), (6, 8276), (Start: 8 @8330 has 55 MA's), (10, 8363), (21, 8549), (27, 8609), (47, 8822), (48, 8831), (49, 8837), (53, 8870), (58, 8900), (64, 8945), (79, 9107),

Gene: MunkgeeRoachy\_13 Start: 7987, Stop: 8829, Start Num: 8

Candidate Starts for MunkgeeRoachy\_13:

(Start: 8 @7987 has 55 MA's), (10, 8020), (21, 8206), (28, 8278), (37, 8377), (47, 8479), (48, 8488), (49, 8494), (53, 8527), (59, 8563), (60, 8572), (78, 8758), (79, 8764),

Gene: Nibbles\_15 Start: 8878, Stop: 9717, Start Num: 8

Candidate Starts for Nibbles\_15:

(Start: 8 @8878 has 55 MA's), (10, 8911), (26, 9139), (32, 9220), (39, 9268), (43, 9325), (44, 9337), (47, 9361), (49, 9376), (63, 9469), (67, 9502), (68, 9514), (69, 9517), (80, 9652), (85, 9700),

Gene: Nina\_14 Start: 8973, Stop: 9815, Start Num: 8

Candidate Starts for Nina\_14:

(Start: 8 @8973 has 55 MA's), (10, 9006), (28, 9264), (37, 9363), (47, 9465), (48, 9474), (49, 9480), (53, 9513), (59, 9549), (60, 9558), (78, 9744), (79, 9750),

Gene: Nodigi\_15 Start: 8929, Stop: 9777, Start Num: 8

Candidate Starts for Nodigi\_15:

(Start: 8 @8929 has 55 MA's), (10, 8962), (19, 9070), (21, 9148), (28, 9220), (34, 9304), (43, 9394), (44, 9406), (47, 9430), (49, 9445), (59, 9514), (64, 9553), (72, 9616), (80, 9721),

Gene: Orla\_15 Start: 8933, Stop: 9781, Start Num: 8

Candidate Starts for Orla\_15:

(Start: 8 @8933 has 55 MA's), (10, 8966), (19, 9074), (21, 9152), (28, 9224), (34, 9308), (43, 9398), (44, 9410), (47, 9434), (49, 9449), (59, 9518), (64, 9557), (72, 9620), (80, 9725),

Gene: P3MA\_13 Start: 8229, Stop: 9089, Start Num: 7

Candidate Starts for P3MA\_13:

(Start: 7 @8229 has 18 MA's), (22, 8448), (23, 8457), (28, 8517), (29, 8520), (30, 8547), (33, 8595), (35, 8610), (38, 8634), (39, 8640), (41, 8655), (50, 8754), (52, 8766), (55, 8799), (60, 8832), (65, 8874), (66, 8877), (74, 8937), (80, 9021), (81, 9030), (83, 9066),

Gene: Pollux\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for Pollux\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: Pons\_13 Start: 7709, Stop: 8545, Start Num: 8

Candidate Starts for Pons\_13:

(1, 7490), (3, 7547), (5, 7595), (6, 7655), (Start: 8 @7709 has 55 MA's), (10, 7742), (21, 7928), (27, 7988), (28, 8000), (47, 8201), (48, 8210), (49, 8216), (53, 8249), (58, 8279), (64, 8324), (79, 8486),

Gene: Posh\_14 Start: 8717, Stop: 9562, Start Num: 7

Candidate Starts for Posh\_14:

(Start: 7 @8717 has 18 MA's), (12, 8786), (13, 8798), (31, 9062), (37, 9107), (39, 9116), (46, 9203), (53, 9257),

Gene: PotPie\_13 Start: 8560, Stop: 9399, Start Num: 8

Candidate Starts for PotPie\_13:

(5, 8446), (6, 8506), (Start: 8 @8560 has 55 MA's), (10, 8593), (21, 8779), (27, 8839), (28, 8851), (47, 9052), (48, 9061), (49, 9067), (53, 9100), (58, 9130), (64, 9175), (75, 9265),

Gene: PsychoKiller\_13 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for PsychoKiller\_13:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (37, 8329), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: Pytheas\_14 Start: 8564, Stop: 9409, Start Num: 7

Candidate Starts for Pytheas\_14:

(Start: 7 @8564 has 18 MA's), (12, 8633), (13, 8645), (31, 8909), (37, 8954), (39, 8963), (53, 9104),

Gene: Quasar\_13 Start: 8548, Stop: 9390, Start Num: 8

Candidate Starts for Quasar\_13:

(Start: 8 @8548 has 55 MA's), (10, 8581), (28, 8839), (37, 8938), (47, 9040), (48, 9049), (49, 9055), (53, 9088), (59, 9124), (60, 9133), (78, 9319), (79, 9325),

Gene: RanchParmCat\_16 Start: 8645, Stop: 9493, Start Num: 8

Candidate Starts for RanchParmCat\_16:

(Start: 8 @8645 has 55 MA's), (10, 8678), (21, 8864), (43, 9110), (44, 9122), (47, 9146), (49, 9161), (59, 9230), (71, 9323), (72, 9332), (84, 9476),

Gene: RedBaron\_14 Start: 7984, Stop: 8826, Start Num: 8

Candidate Starts for RedBaron\_14:

(Start: 8 @7984 has 55 MA's), (10, 8017), (21, 8203), (28, 8275), (37, 8374), (47, 8476), (48, 8485), (49, 8491), (53, 8524), (59, 8560), (60, 8569), (78, 8755), (79, 8761),

Gene: SheckWes\_12 Start: 7697, Stop: 8533, Start Num: 8

Candidate Starts for SheckWes\_12:

(5, 7583), (6, 7643), (Start: 8 @7697 has 55 MA's), (10, 7730), (21, 7916), (27, 7976), (28, 7988), (47, 8189), (48, 8198), (49, 8204), (53, 8237), (58, 8267), (64, 8312), (79, 8474),

Gene: SketchMex\_12 Start: 7925, Stop: 8770, Start Num: 8

Candidate Starts for SketchMex\_12:

(5, 7808), (6, 7868), (Start: 8 @7925 has 55 MA's), (10, 7958), (21, 8144), (28, 8216), (47, 8417), (49, 8432), (53, 8465), (60, 8510), (78, 8696), (79, 8702),

Gene: Sleepyhead\_13 Start: 8334, Stop: 9200, Start Num: 8

Candidate Starts for Sleepyhead\_13:

(Start: 8 @8334 has 55 MA's), (9, 8361), (11, 8388), (20, 8526), (45, 8811), (60, 8949),

Gene: Sopespian\_13 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for Sopespian\_13:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (37, 8329), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: SteamedHams\_15 Start: 7954, Stop: 8799, Start Num: 8

Candidate Starts for SteamedHams\_15:

(6, 7897), (Start: 8 @7954 has 55 MA's), (10, 7987), (21, 8173), (28, 8245), (47, 8446), (49, 8461), (53, 8494), (59, 8530), (60, 8539), (64, 8569), (78, 8725), (79, 8731),

Gene: SummitAcademy\_12 Start: 7775, Stop: 8614, Start Num: 8

Candidate Starts for SummitAcademy\_12:

(5, 7661), (6, 7721), (Start: 8 @7775 has 55 MA's), (10, 7808), (21, 7994), (27, 8054), (28, 8066), (47, 8267), (48, 8276), (49, 8282), (53, 8315), (58, 8345), (64, 8390), (75, 8480),

Gene: Survivors\_15 Start: 8732, Stop: 9571, Start Num: 8

Candidate Starts for Survivors\_15:

(Start: 8 @8732 has 55 MA's), (10, 8765), (26, 8993), (32, 9074), (39, 9122), (43, 9179), (44, 9191), (47, 9215), (49, 9230), (63, 9323), (67, 9356), (68, 9368), (69, 9371), (80, 9506), (85, 9554),

Gene: SweatNTears\_15 Start: 8436, Stop: 9281, Start Num: 8

Candidate Starts for SweatNTears\_15:

(5, 8319), (6, 8379), (Start: 8 @8436 has 55 MA's), (10, 8469), (21, 8655), (28, 8727), (47, 8928), (49, 8943), (53, 8976), (60, 9021), (78, 9207), (79, 9213),

Gene: TPA4\_13 Start: 9127, Stop: 9984, Start Num: 7

Candidate Starts for TPA4\_13:

(Start: 7 @9127 has 18 MA's), (18, 9256), (25, 9376), (28, 9406), (47, 9625), (50, 9646), (51, 9649), (54, 9688), (57, 9700), (76, 9868), (77, 9898), (81, 9928), (83, 9964),

Gene: Tolls\_15 Start: 7957, Stop: 8802, Start Num: 8

Candidate Starts for Tolls\_15:

(6, 7900), (Start: 8 @7957 has 55 MA's), (10, 7990), (21, 8176), (28, 8248), (47, 8449), (49, 8464), (53, 8497), (59, 8533), (60, 8542), (64, 8572), (78, 8728), (79, 8734),

Gene: Troje\_13 Start: 7910, Stop: 8755, Start Num: 8

Candidate Starts for Troje\_13:

(5, 7793), (6, 7853), (Start: 8 @7910 has 55 MA's), (10, 7943), (21, 8129), (28, 8201), (47, 8402), (49, 8417), (53, 8450), (60, 8495), (78, 8681), (79, 8687),

Gene: Typhonomachy\_14 Start: 7939, Stop: 8781, Start Num: 8

Candidate Starts for Typhonomachy\_14:

(Start: 8 @7939 has 55 MA's), (10, 7972), (21, 8158), (28, 8230), (37, 8329), (47, 8431), (48, 8440), (49, 8446), (53, 8479), (59, 8515), (60, 8524), (78, 8710), (79, 8716),

Gene: Vine\_14 Start: 8704, Stop: 9543, Start Num: 8

Candidate Starts for Vine\_14:

(5, 8590), (6, 8650), (Start: 8 @8704 has 55 MA's), (10, 8737), (21, 8923), (27, 8983), (28, 8995), (47, 9196), (48, 9205), (49, 9211), (53, 9244), (58, 9274), (64, 9319), (75, 9409),

Gene: Wrigley\_14 Start: 8561, Stop: 9406, Start Num: 7

Candidate Starts for Wrigley\_14:

(Start: 7 @8561 has 18 MA's), (12, 8630), (13, 8642), (31, 8906), (37, 8951), (39, 8960), (46, 9047), (53, 9101),

Gene: Yakult\_14 Start: 7841, Stop: 8674, Start Num: 8

Candidate Starts for Yakult\_14:

(Start: 8 @7841 has 55 MA's), (10, 7874), (14, 7946), (17, 7964), (19, 7970), (21, 8048), (32, 8189), (34, 8204), (43, 8294), (44, 8306), (45, 8312), (47, 8330), (49, 8345), (61, 8423), (63, 8435), (72, 8513), (78, 8609), (84, 8657),

Gene: Yarn\_12 Start: 7947, Stop: 8792, Start Num: 8

Candidate Starts for Yarn\_12:

(6, 7890), (Start: 8 @7947 has 55 MA's), (10, 7980), (21, 8166), (28, 8238), (47, 8439), (49, 8454), (53, 8487), (59, 8523), (60, 8532), (64, 8562), (78, 8718), (79, 8724),

Gene: Yummy\_14 Start: 7821, Stop: 8666, Start Num: 8

Candidate Starts for Yummy\_14:

(Start: 8 @7821 has 55 MA's), (10, 7854), (21, 8040), (28, 8112), (47, 8313), (49, 8328), (53, 8361), (60, 8406), (78, 8592), (79, 8598),

Gene: Zareef\_17 Start: 8879, Stop: 9718, Start Num: 8

Candidate Starts for Zareef\_17:

(Start: 8 @8879 has 55 MA's), (10, 8912), (26, 9140), (32, 9221), (39, 9269), (43, 9326), (44, 9338), (47, 9362), (49, 9377), (63, 9470), (67, 9503), (68, 9515), (69, 9518), (80, 9653), (85, 9701),