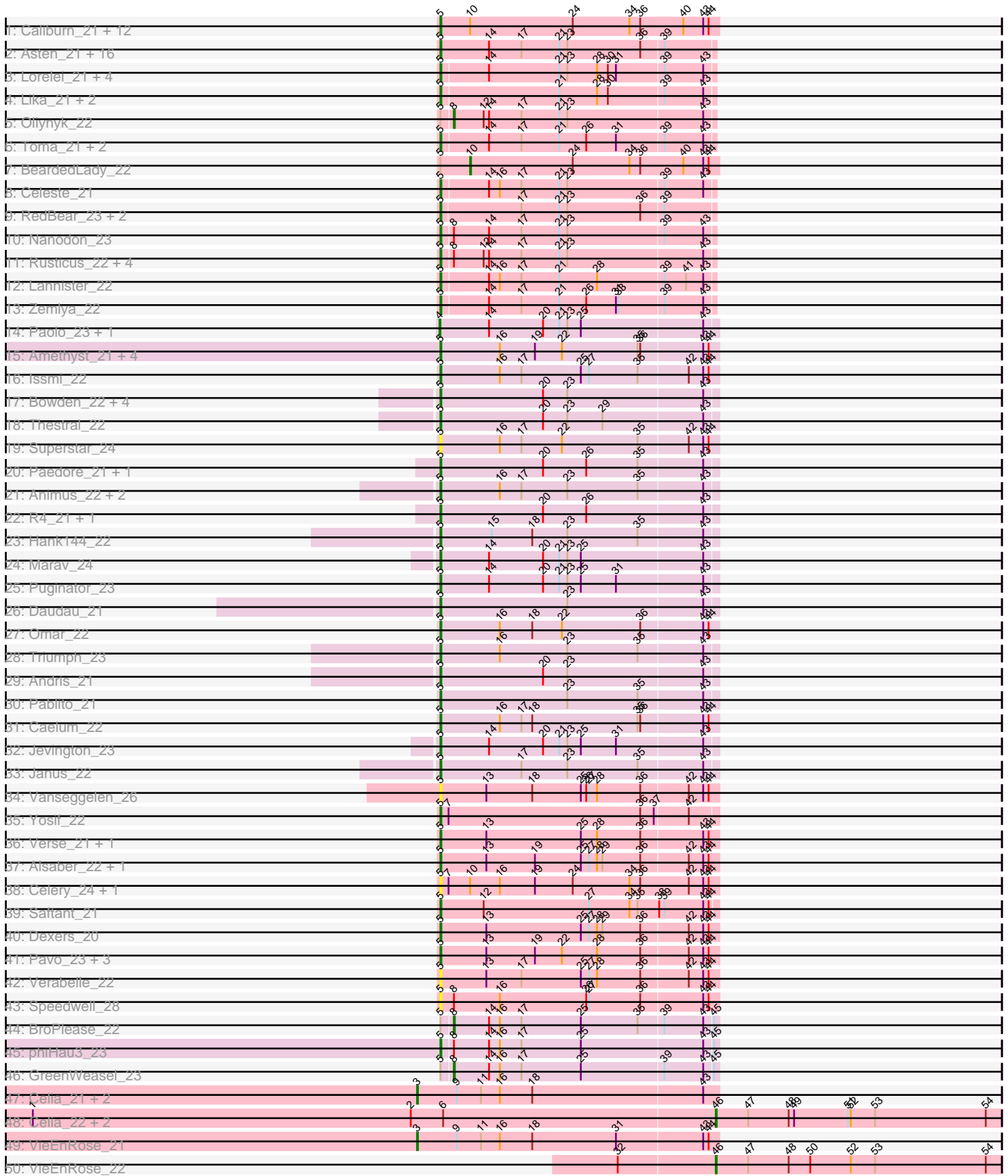


# Pham 192434



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 192434 Report

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

Pham number 192434 has 115 members, 8 are drafts.

Phages represented in each track:

- Track 1 : Caliburn\_21, Legacy\_21, Nerdos\_21, Phettuccine\_21, Leviticus\_21, Unstoppable\_21, SunsetPointe\_21, Aaronocolus\_21, Hydra\_23, Indigo\_21, Bovely\_21, Ozzie\_21, Esperer\_21
- Track 2 : Asten\_21, TuanPN\_21, Snorlax\_21, Yasdnil\_21, Maneekul\_21, Hippo\_21, Ejemplo\_21, Werner\_21, Dwayne\_21, SarahRose\_21, Chucky\_21, BarryBee\_23, OzzyJ\_22, TagePhighter\_22, Whatever\_21, Triste\_21, Emaanora\_23
- Track 3 : Lorelei\_21, Danzina\_22, Brataylor\_22, Nabi\_21, Rana\_21
- Track 4 : Lika\_21, Sujidade\_22, Godpower\_22
- Track 5 : Oliynyk\_22
- Track 6 : Toma\_21, Dattran\_22, Goby\_21
- Track 7 : BeardedLady\_22
- Track 8 : Celeste\_21
- Track 9 : RedBear\_23, Katalie\_22, South40\_22
- Track 10 : Nanodon\_23
- Track 11 : Rusticus\_22, Izzy\_22, Jash\_22, BryanRecycles\_22, Eddasa\_22
- Track 12 : Lannister\_22
- Track 13 : Zemlya\_22
- Track 14 : Paolo\_23, Zainub\_23
- Track 15 : Amethyst\_21, Diane\_21, Haizum\_21, Nishikigoi\_21, Tefunt\_21
- Track 16 : Issmi\_22
- Track 17 : Bowden\_22, TrvxScott\_20, BartholomewSD\_23, Alvy\_23, TinaBelcher\_21
- Track 18 : Thestral\_22
- Track 19 : Superstar\_24
- Track 20 : Paedore\_21, Loofah\_22
- Track 21 : Animus\_22, SqueakyClean\_22, GirlDinner\_21
- Track 22 : R4\_21, ELB20\_20
- Track 23 : Hank144\_22
- Track 24 : Marav\_24
- Track 25 : Puginator\_23
- Track 26 : Daudau\_21
- Track 27 : Omar\_22
- Track 28 : Triumph\_23
- Track 29 : Andris\_21
- Track 30 : Pablito\_21
- Track 31 : Caelum\_22
- Track 32 : Jevington\_23

- Track 33 : Janus\_22
- Track 34 : Vanseggelen\_26
- Track 35 : Yosif\_22
- Track 36 : Verse\_21, Amela\_21
- Track 37 : Alsaber\_22, Kaine\_22
- Track 38 : Celery\_24, phiCAM\_22
- Track 39 : Saftant\_21
- Track 40 : Dexers\_20
- Track 41 : Pavo\_23, ElGato\_22, Conan\_22, Provolone\_22
- Track 42 : Verabelle\_22
- Track 43 : Speedwell\_28
- Track 44 : BroPlease\_22
- Track 45 : phiHau3\_23
- Track 46 : GreenWeasel\_23
- Track 47 : Celia\_21, Urza\_21, Itza\_21
- Track 48 : Celia\_22, Urza\_22, Itza\_22
- Track 49 : VieEnRose\_21
- Track 50 : VieEnRose\_22

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

The start number called the most often in the published annotations is 5, it was called in 93 of the 107 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_21, Alsaber\_22, Alvy\_23, Amela\_21, Amethyst\_21, Andris\_21, Animus\_22, Asten\_21, BarryBee\_23, BartholomewSD\_23, Bovely\_21, Bowden\_22, Brataylor\_22, BryanRecycles\_22, Caelum\_22, Caliburn\_21, Celery\_24, Celeste\_21, Chucky\_21, Conan\_22, Danzina\_22, Dattran\_22, Daudau\_21, Dexers\_20, Diane\_21, Dwayne\_21, ELB20\_20, Eddasa\_22, Ejemplo\_21, ElGato\_22, Emaanora\_23, Esperer\_21, GirlDinner\_21, Goby\_21, Godpower\_22, Haizum\_21, Hank144\_22, Hippo\_21, Hydra\_23, Indigo\_21, Issmi\_22, Izzy\_22, Janus\_22, Jash\_22, Jevington\_23, Kaine\_22, Katalie\_22, Lannister\_22, Legacy\_21, Leviticus\_21, Lika\_21, Loofah\_22, Lorelei\_21, Maneekul\_21, Marav\_24, Nabi\_21, Nanodon\_23, Nerdos\_21, Nishikigoi\_21, Omar\_22, Ozzie\_21, OzzyJ\_22, Pablito\_21, Paedore\_21, Pavo\_23, Phettuccine\_21, Provolone\_22, Puginator\_23, R4\_21, Rana\_21, RedBear\_23, Rusticus\_22, Saftant\_21, SarahRose\_21, Snorlax\_21, South40\_22, Speedwell\_28, SqueakyClean\_22, Sujidade\_22, SunsetPointe\_21, Superstar\_24, TagePhighter\_22, Tefunt\_21, Thestral\_22, TinaBelcher\_21, Toma\_21, Triste\_21, Triumph\_23, TrvxScott\_20, TuanPN\_21, Unstoppable\_21, Vanseggelen\_26, Verabelle\_22, Verse\_21, Werner\_21, Whatever\_21, Yasdnil\_21, Yosif\_22, Zemlya\_22, phiCAM\_22, phiHau3\_23,

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

- BeardedLady\_22, BroPlease\_22, GreenWeasel\_23, Oliynyk\_22,

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

- Celia\_21, Celia\_22, Itza\_21, Itza\_22, Paolo\_23, Urza\_21, Urza\_22, VieEnRose\_21, VieEnRose\_22, Zainub\_23,

## Summary by start number:

### Start 3:

- Found in 4 of 115 ( 3.5% ) of genes in pham
- Manual Annotations of this start: 4 of 107
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Celia\_21 (BD6), Itza\_21 (BD6), Urza\_21 (BD6), VieEnRose\_21 (BD6),

### Start 4:

- Found in 2 of 115 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 2 of 107
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Paolo\_23 (BD2), Zainub\_23 (BD2),

### Start 5:

- Found in 105 of 115 ( 91.3% ) of genes in pham
- Manual Annotations of this start: 93 of 107
- Called 96.2% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_21 (BD1), Alsaber\_22 (BD3), Alvy\_23 (BD2), Amela\_21 (BD3), Amethyst\_21 (BD2), Andris\_21 (BD2), Animus\_22 (BD2), Asten\_21 (BD1), BarryBee\_23 (BD1), BartholomewSD\_23 (BD2), Bovely\_21 (BD1), Bowden\_22 (BD2), Brataylor\_22 (BD1), BryanRecycles\_22 (BD1), Caelum\_22 (BD2), Caliburn\_21 (BD1), Celery\_24 (BD3), Celeste\_21 (BD1), Chucky\_21 (BD1), Conan\_22 (BD3), Danzina\_22 (BD1), Dattran\_22 (BD1), Daudau\_21 (BD2), Dexers\_20 (BD3), Diane\_21 (BD2), Dwayne\_21 (BD1), ELB20\_20 (BD2), Eddasa\_22 (BD1), Ejemplo\_21 (BD1), ElGato\_22 (BD3), Emaanora\_23 (BD1), Esperer\_21 (BD1), GirlDinner\_21 (BD2), Goby\_21 (BD1), Godpower\_22 (BD1), Haizum\_21 (BD2), Hank144\_22 (BD2), Hippo\_21 (BD1), Hydra\_23 (BD1), Indigo\_21 (BD1), Issmi\_22 (BD2), Izzy\_22 (BD1), Janus\_22 (BD2), Jash\_22 (BD1), Jevington\_23 (BD2), Kaine\_22 (BD3), Katalie\_22 (BD1), Lannister\_22 (BD1), Legacy\_21 (BD1), Leviticus\_21 (BD1), Lika\_21 (BD1), Loofah\_22 (BD2), Lorelei\_21 (BD1), Maneekul\_21 (BD1), Marav\_24 (BD2), Nabi\_21 (BD1), Nanodon\_23 (BD1), Nerdos\_21 (BD1), Nishikigoi\_21 (BD2), Omar\_22 (BD2), Ozzie\_21 (BD1), OzzyJ\_22 (BD1), Pablito\_21 (BD2), Paedore\_21 (BD2), Pavo\_23 (BD3), Phettuccine\_21 (BD1), Provolone\_22 (BD3), Puginator\_23 (BD2), R4\_21 (BD2), Rana\_21 (BD1), RedBear\_23 (BD1), Rusticus\_22 (BD1), Saftant\_21 (BD3), SarahRose\_21 (BD1), Snorlax\_21 (BD1), South40\_22 (BD1), Speedwell\_28 (BD3), SqueakyClean\_22 (BD2), Sujidade\_22 (BD1), SunsetPointe\_21 (BD1), Superstar\_24 (BD2), TagePhighter\_22 (BD1), Tefunt\_21 (BD2), Thestral\_22 (BD2), TinaBelcher\_21 (BD2), Toma\_21 (BD1), Triste\_21 (BD1), Triumph\_23 (BD2), TrvxScott\_20 (BD2), TuanPN\_21 (BD1), Unstoppable\_21 (BD1), Vanseggelen\_26 (BD3), Verabelle\_22 (BD3), Verse\_21 (BD3), Werner\_21 (BD1), Whatever\_21 (BD1), Yasdnil\_21 (BD1), Yosif\_22 (BD3), Zemlya\_22 (BD1), phiCAM\_22 (BD3), phiHau3\_23 (BD4),

### Start 8:

- Found in 11 of 115 ( 9.6% ) of genes in pham
- Manual Annotations of this start: 3 of 107
- Called 27.3% of time when present
- Phage (with cluster) where this start called: BroPlease\_22 (BD4), GreenWeasel\_23 (BD4), Oliynyk\_22 (BD1),

### Start 10:

- Found in 16 of 115 ( 13.9% ) of genes in pham
- Manual Annotations of this start: 1 of 107
- Called 6.2% of time when present
- Phage (with cluster) where this start called: BeardedLady\_22 (BD1),

Start 46:

- Found in 4 of 115 ( 3.5% ) of genes in pham
- Manual Annotations of this start: 4 of 107
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Celia\_22 (BD6), Itza\_22 (BD6), Urza\_22 (BD6), VieEnRose\_22 (BD6),

### **Summary by clusters:**

There are 5 clusters represented in this pham: BD4, BD6, BD1, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 5 was manually annotated 53 times for cluster BD1.
- Start number 8 was manually annotated 1 time for cluster BD1.
- Start number 10 was manually annotated 1 time for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 4 was manually annotated 2 times for cluster BD2.
- Start number 5 was manually annotated 30 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 5 was manually annotated 9 times for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 5 was manually annotated 1 time for cluster BD4.
- Start number 8 was manually annotated 2 times for cluster BD4.

Info for manual annotations of cluster BD6:

- Start number 3 was manually annotated 4 times for cluster BD6.
- Start number 46 was manually annotated 4 times for cluster BD6.

### **Gene Information:**

Gene: Aaronocolus\_21 Start: 17072, Stop: 17380, Start Num: 5

Candidate Starts for Aaronocolus\_21:

(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),

Gene: Alsaber\_22 Start: 17759, Stop: 18064, Start Num: 5

Candidate Starts for Alsaber\_22:

(Start: 5 @17759 has 93 MA's), (13, 17810), (19, 17864), (25, 17915), (27, 17924), (28, 17933), (29, 17939), (36, 17981), (42, 18032), (43, 18047), (44, 18053),

Gene: Alvy\_23 Start: 17073, Stop: 17375, Start Num: 5

Candidate Starts for Alvy\_23:

(Start: 5 @17073 has 93 MA's), (20, 17187), (23, 17214), (43, 17361),

Gene: Amela\_21 Start: 18052, Stop: 18357, Start Num: 5

Candidate Starts for Amela\_21:

(Start: 5 @18052 has 93 MA's), (13, 18103), (25, 18208), (28, 18226), (36, 18274), (43, 18340), (44, 18346),

Gene: Amethyst\_21 Start: 17528, Stop: 17833, Start Num: 5

Candidate Starts for Amethyst\_21:

(Start: 5 @17528 has 93 MA's), (16, 17594), (19, 17633), (22, 17663), (35, 17747), (36, 17750), (43, 17816), (44, 17822),

Gene: Andris\_21 Start: 16778, Stop: 17080, Start Num: 5

Candidate Starts for Andris\_21:

(Start: 5 @16778 has 93 MA's), (20, 16892), (23, 16919), (43, 17066),

Gene: Animus\_22 Start: 17114, Stop: 17416, Start Num: 5

Candidate Starts for Animus\_22:

(Start: 5 @17114 has 93 MA's), (16, 17180), (17, 17204), (23, 17255), (35, 17333), (43, 17402),

Gene: Asten\_21 Start: 17035, Stop: 17334, Start Num: 5

Candidate Starts for Asten\_21:

(Start: 5 @17035 has 93 MA's), (14, 17089), (17, 17125), (21, 17167), (23, 17176), (36, 17257), (39, 17281),

Gene: BarryBee\_23 Start: 17045, Stop: 17344, Start Num: 5

Candidate Starts for BarryBee\_23:

(Start: 5 @17045 has 93 MA's), (14, 17099), (17, 17135), (21, 17177), (23, 17186), (36, 17267), (39, 17291),

Gene: BartholomewSD\_23 Start: 17073, Stop: 17375, Start Num: 5

Candidate Starts for BartholomewSD\_23:

(Start: 5 @17073 has 93 MA's), (20, 17187), (23, 17214), (43, 17361),

Gene: BeardedLady\_22 Start: 17352, Stop: 17627, Start Num: 10

Candidate Starts for BeardedLady\_22:

(Start: 5 @17319 has 93 MA's), (Start: 10 @17352 has 1 MA's), (24, 17466), (34, 17529), (36, 17541), (40, 17589), (43, 17610), (44, 17616),

Gene: Bovely\_21 Start: 17078, Stop: 17386, Start Num: 5

Candidate Starts for Bovely\_21:

(Start: 5 @17078 has 93 MA's), (Start: 10 @17111 has 1 MA's), (24, 17225), (34, 17288), (36, 17300), (40, 17348), (43, 17369), (44, 17375),

Gene: Bowden\_22 Start: 17005, Stop: 17307, Start Num: 5

Candidate Starts for Bowden\_22:

(Start: 5 @17005 has 93 MA's), (20, 17119), (23, 17146), (43, 17293),

Gene: Brataylor\_22 Start: 17062, Stop: 17358, Start Num: 5

Candidate Starts for Brataylor\_22:

(Start: 5 @17062 has 93 MA's), (14, 17113), (21, 17191), (23, 17200), (28, 17233), (30, 17245), (31, 17254), (39, 17305), (43, 17347),

Gene: BroPlease\_22 Start: 17764, Stop: 18051, Start Num: 8

Candidate Starts for BroPlease\_22:

(Start: 5 @17752 has 93 MA's), (Start: 8 @17764 has 3 MA's), (14, 17803), (16, 17815), (17, 17839), (25, 17905), (35, 17968), (39, 17995), (43, 18037), (45, 18046),

Gene: BryanRecycles\_22 Start: 17223, Stop: 17519, Start Num: 5

Candidate Starts for BryanRecycles\_22:

(Start: 5 @17223 has 93 MA's), (Start: 8 @17235 has 3 MA's), (12, 17268), (14, 17274), (17, 17310), (21, 17352), (23, 17361), (43, 17508),

Gene: Caelum\_22 Start: 17555, Stop: 17860, Start Num: 5

Candidate Starts for Caelum\_22:

(Start: 5 @17555 has 93 MA's), (16, 17621), (17, 17645), (18, 17657), (35, 17774), (36, 17777), (43, 17843), (44, 17849),

Gene: Caliburn\_21 Start: 17052, Stop: 17360, Start Num: 5

Candidate Starts for Caliburn\_21:

(Start: 5 @17052 has 93 MA's), (Start: 10 @17085 has 1 MA's), (24, 17199), (34, 17262), (36, 17274), (40, 17322), (43, 17343), (44, 17349),

Gene: Celery\_24 Start: 17710, Stop: 18018, Start Num: 5

Candidate Starts for Celery\_24:

(Start: 5 @17710 has 93 MA's), (7, 17719), (Start: 10 @17743 has 1 MA's), (16, 17776), (19, 17815), (24, 17857), (34, 17920), (36, 17932), (42, 17986), (43, 18001), (44, 18007),

Gene: Celeste\_21 Start: 17054, Stop: 17350, Start Num: 5

Candidate Starts for Celeste\_21:

(Start: 5 @17054 has 93 MA's), (14, 17105), (16, 17117), (17, 17141), (21, 17183), (23, 17192), (39, 17297), (43, 17339),

Gene: Celia\_21 Start: 17498, Stop: 17827, Start Num: 3

Candidate Starts for Celia\_21:

(Start: 3 @17498 has 4 MA's), (9, 17540), (11, 17567), (16, 17588), (18, 17624), (43, 17810),

Gene: Celia\_22 Start: 17824, Stop: 18141, Start Num: 46

Candidate Starts for Celia\_22:

(1, 17071), (2, 17491), (6, 17527), (Start: 46 @17824 has 4 MA's), (47, 17860), (48, 17905), (49, 17911), (51, 17971), (52, 17974), (53, 18001), (54, 18124),

Gene: Chucky\_21 Start: 17046, Stop: 17345, Start Num: 5

Candidate Starts for Chucky\_21:

(Start: 5 @17046 has 93 MA's), (14, 17100), (17, 17136), (21, 17178), (23, 17187), (36, 17268), (39, 17292),

Gene: Conan\_22 Start: 17481, Stop: 17786, Start Num: 5

Candidate Starts for Conan\_22:

(Start: 5 @17481 has 93 MA's), (13, 17532), (19, 17586), (22, 17616), (28, 17655), (36, 17703), (42, 17754), (43, 17769), (44, 17775),

Gene: Danzina\_22 Start: 17264, Stop: 17560, Start Num: 5

Candidate Starts for Danzina\_22:

(Start: 5 @17264 has 93 MA's), (14, 17315), (21, 17393), (23, 17402), (28, 17435), (30, 17447), (31, 17456), (39, 17507), (43, 17549),

Gene: Dattran\_22 Start: 17053, Stop: 17349, Start Num: 5

Candidate Starts for Dattran\_22:

(Start: 5 @17053 has 93 MA's), (14, 17104), (17, 17140), (21, 17182), (26, 17212), (31, 17245), (39, 17296), (43, 17338),

Gene: Daudau\_21 Start: 16985, Stop: 17287, Start Num: 5

Candidate Starts for Daudau\_21:

(Start: 5 @16985 has 93 MA's), (23, 17126), (43, 17273),

Gene: Dexers\_20 Start: 17462, Stop: 17767, Start Num: 5

Candidate Starts for Dexers\_20:

(Start: 5 @17462 has 93 MA's), (13, 17513), (25, 17618), (27, 17627), (28, 17636), (29, 17642), (36, 17684), (42, 17735), (43, 17750), (44, 17756),

Gene: Diane\_21 Start: 17521, Stop: 17826, Start Num: 5

Candidate Starts for Diane\_21:

(Start: 5 @17521 has 93 MA's), (16, 17587), (19, 17626), (22, 17656), (35, 17740), (36, 17743), (43, 17809), (44, 17815),

Gene: Dwayne\_21 Start: 17042, Stop: 17341, Start Num: 5

Candidate Starts for Dwayne\_21:

(Start: 5 @17042 has 93 MA's), (14, 17096), (17, 17132), (21, 17174), (23, 17183), (36, 17264), (39, 17288),

Gene: ELB20\_20 Start: 17109, Stop: 17411, Start Num: 5

Candidate Starts for ELB20\_20:

(Start: 5 @17109 has 93 MA's), (20, 17223), (26, 17271), (43, 17397),

Gene: Eddasa\_22 Start: 17223, Stop: 17519, Start Num: 5

Candidate Starts for Eddasa\_22:

(Start: 5 @17223 has 93 MA's), (Start: 8 @17235 has 3 MA's), (12, 17268), (14, 17274), (17, 17310), (21, 17352), (23, 17361), (43, 17508),

Gene: Ejemplo\_21 Start: 17042, Stop: 17341, Start Num: 5

Candidate Starts for Ejemplo\_21:

(Start: 5 @17042 has 93 MA's), (14, 17096), (17, 17132), (21, 17174), (23, 17183), (36, 17264), (39, 17288),

Gene: ElGato\_22 Start: 17484, Stop: 17789, Start Num: 5

Candidate Starts for ElGato\_22:

(Start: 5 @17484 has 93 MA's), (13, 17535), (19, 17589), (22, 17619), (28, 17658), (36, 17706), (42, 17757), (43, 17772), (44, 17778),

Gene: Emaanora\_23 Start: 17045, Stop: 17344, Start Num: 5

Candidate Starts for Emaanora\_23:

(Start: 5 @17045 has 93 MA's), (14, 17099), (17, 17135), (21, 17177), (23, 17186), (36, 17267), (39, 17291),

Gene: Esperer\_21 Start: 17072, Stop: 17380, Start Num: 5

Candidate Starts for Esperer\_21:

(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),



Gene: GirlDinner\_21 Start: 16776, Stop: 17078, Start Num: 5  
Candidate Starts for GirlDinner\_21:  
(Start: 5 @16776 has 93 MA's), (16, 16842), (17, 16866), (23, 16917), (35, 16995), (43, 17064),

Gene: Goby\_21 Start: 17059, Stop: 17355, Start Num: 5  
Candidate Starts for Goby\_21:  
(Start: 5 @17059 has 93 MA's), (14, 17110), (17, 17146), (21, 17188), (26, 17218), (31, 17251), (39, 17302), (43, 17344),

Gene: Godpower\_22 Start: 17070, Stop: 17366, Start Num: 5  
Candidate Starts for Godpower\_22:  
(Start: 5 @17070 has 93 MA's), (21, 17199), (28, 17241), (30, 17253), (39, 17313), (43, 17355),

Gene: GreenWeasel\_23 Start: 17773, Stop: 18060, Start Num: 8  
Candidate Starts for GreenWeasel\_23:  
(Start: 5 @17761 has 93 MA's), (Start: 8 @17773 has 3 MA's), (14, 17812), (16, 17824), (17, 17848), (25, 17914), (39, 18004), (43, 18046), (45, 18055),

Gene: Haizum\_21 Start: 17553, Stop: 17858, Start Num: 5  
Candidate Starts for Haizum\_21:  
(Start: 5 @17553 has 93 MA's), (16, 17619), (19, 17658), (22, 17688), (35, 17772), (36, 17775), (43, 17841), (44, 17847),

Gene: Hank144\_22 Start: 17171, Stop: 17473, Start Num: 5  
Candidate Starts for Hank144\_22:  
(Start: 5 @17171 has 93 MA's), (15, 17228), (18, 17273), (23, 17312), (35, 17390), (43, 17459),

Gene: Hippo\_21 Start: 17045, Stop: 17344, Start Num: 5  
Candidate Starts for Hippo\_21:  
(Start: 5 @17045 has 93 MA's), (14, 17099), (17, 17135), (21, 17177), (23, 17186), (36, 17267), (39, 17291),

Gene: Hydra\_23 Start: 17600, Stop: 17908, Start Num: 5  
Candidate Starts for Hydra\_23:  
(Start: 5 @17600 has 93 MA's), (Start: 10 @17633 has 1 MA's), (24, 17747), (34, 17810), (36, 17822), (40, 17870), (43, 17891), (44, 17897),

Gene: Indigo\_21 Start: 17072, Stop: 17380, Start Num: 5  
Candidate Starts for Indigo\_21:  
(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),

Gene: Issmi\_22 Start: 17987, Stop: 18292, Start Num: 5  
Candidate Starts for Issmi\_22:  
(Start: 5 @17987 has 93 MA's), (16, 18053), (17, 18077), (25, 18143), (27, 18152), (35, 18206), (42, 18260), (43, 18275), (44, 18281),

Gene: Itza\_22 Start: 17747, Stop: 18064, Start Num: 46  
Candidate Starts for Itza\_22:  
(1, 16994), (2, 17414), (6, 17450), (Start: 46 @17747 has 4 MA's), (47, 17783), (48, 17828), (49, 17834), (51, 17894), (52, 17897), (53, 17924), (54, 18047),

Gene: Itza\_21 Start: 17421, Stop: 17750, Start Num: 3

Candidate Starts for Itza\_21:

(Start: 3 @17421 has 4 MA's), (9, 17463), (11, 17490), (16, 17511), (18, 17547), (43, 17733),

Gene: Izzy\_22 Start: 17270, Stop: 17566, Start Num: 5

Candidate Starts for Izzy\_22:

(Start: 5 @17270 has 93 MA's), (Start: 8 @17282 has 3 MA's), (12, 17315), (14, 17321), (17, 17357), (21, 17399), (23, 17408), (43, 17555),

Gene: Janus\_22 Start: 17114, Stop: 17416, Start Num: 5

Candidate Starts for Janus\_22:

(Start: 5 @17114 has 93 MA's), (17, 17204), (23, 17255), (35, 17333), (43, 17402),

Gene: Jash\_22 Start: 17223, Stop: 17519, Start Num: 5

Candidate Starts for Jash\_22:

(Start: 5 @17223 has 93 MA's), (Start: 8 @17235 has 3 MA's), (12, 17268), (14, 17274), (17, 17310), (21, 17352), (23, 17361), (43, 17508),

Gene: Jevington\_23 Start: 17423, Stop: 17725, Start Num: 5

Candidate Starts for Jevington\_23:

(Start: 5 @17423 has 93 MA's), (14, 17477), (20, 17537), (21, 17555), (23, 17564), (25, 17579), (31, 17618), (43, 17711),

Gene: Kaine\_22 Start: 17462, Stop: 17767, Start Num: 5

Candidate Starts for Kaine\_22:

(Start: 5 @17462 has 93 MA's), (13, 17513), (19, 17567), (25, 17618), (27, 17627), (28, 17636), (29, 17642), (36, 17684), (42, 17735), (43, 17750), (44, 17756),

Gene: Katalie\_22 Start: 17311, Stop: 17607, Start Num: 5

Candidate Starts for Katalie\_22:

(Start: 5 @17311 has 93 MA's), (17, 17398), (21, 17440), (23, 17449), (36, 17530), (39, 17554),

Gene: Lannister\_22 Start: 17079, Stop: 17375, Start Num: 5

Candidate Starts for Lannister\_22:

(Start: 5 @17079 has 93 MA's), (14, 17130), (16, 17142), (17, 17166), (21, 17208), (28, 17250), (39, 17322), (41, 17346), (43, 17364),

Gene: Legacy\_21 Start: 17043, Stop: 17351, Start Num: 5

Candidate Starts for Legacy\_21:

(Start: 5 @17043 has 93 MA's), (Start: 10 @17076 has 1 MA's), (24, 17190), (34, 17253), (36, 17265), (40, 17313), (43, 17334), (44, 17340),

Gene: Leviticus\_21 Start: 17072, Stop: 17380, Start Num: 5

Candidate Starts for Leviticus\_21:

(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),

Gene: Lika\_21 Start: 17074, Stop: 17370, Start Num: 5

Candidate Starts for Lika\_21:

(Start: 5 @17074 has 93 MA's), (21, 17203), (28, 17245), (30, 17257), (39, 17317), (43, 17359),

Gene: Loofah\_22 Start: 17038, Stop: 17340, Start Num: 5

Candidate Starts for Loofah\_22:

(Start: 5 @17038 has 93 MA's), (20, 17152), (26, 17200), (35, 17257), (43, 17326),

Gene: Lorelei\_21 Start: 17044, Stop: 17340, Start Num: 5

Candidate Starts for Lorelei\_21:

(Start: 5 @17044 has 93 MA's), (14, 17095), (21, 17173), (23, 17182), (28, 17215), (30, 17227), (31, 17236), (39, 17287), (43, 17329),

Gene: Maneekul\_21 Start: 17041, Stop: 17340, Start Num: 5

Candidate Starts for Maneekul\_21:

(Start: 5 @17041 has 93 MA's), (14, 17095), (17, 17131), (21, 17173), (23, 17182), (36, 17263), (39, 17287),

Gene: Marav\_24 Start: 17773, Stop: 18075, Start Num: 5

Candidate Starts for Marav\_24:

(Start: 5 @17773 has 93 MA's), (14, 17827), (20, 17887), (21, 17905), (23, 17914), (25, 17929), (43, 18061),

Gene: Nabi\_21 Start: 17044, Stop: 17340, Start Num: 5

Candidate Starts for Nabi\_21:

(Start: 5 @17044 has 93 MA's), (14, 17095), (21, 17173), (23, 17182), (28, 17215), (30, 17227), (31, 17236), (39, 17287), (43, 17329),

Gene: Nanodon\_23 Start: 17252, Stop: 17548, Start Num: 5

Candidate Starts for Nanodon\_23:

(Start: 5 @17252 has 93 MA's), (Start: 8 @17264 has 3 MA's), (14, 17303), (17, 17339), (21, 17381), (23, 17390), (39, 17495), (43, 17537),

Gene: Nerdos\_21 Start: 17072, Stop: 17380, Start Num: 5

Candidate Starts for Nerdos\_21:

(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),

Gene: Nishikigoi\_21 Start: 17553, Stop: 17858, Start Num: 5

Candidate Starts for Nishikigoi\_21:

(Start: 5 @17553 has 93 MA's), (16, 17619), (19, 17658), (22, 17688), (35, 17772), (36, 17775), (43, 17841), (44, 17847),

Gene: Oliynyk\_22 Start: 17235, Stop: 17519, Start Num: 8

Candidate Starts for Oliynyk\_22:

(Start: 5 @17223 has 93 MA's), (Start: 8 @17235 has 3 MA's), (12, 17268), (14, 17274), (17, 17310), (21, 17352), (23, 17361), (43, 17508),

Gene: Omar\_22 Start: 17891, Stop: 18196, Start Num: 5

Candidate Starts for Omar\_22:

(Start: 5 @17891 has 93 MA's), (16, 17957), (18, 17993), (22, 18026), (36, 18113), (43, 18179), (44, 18185),

Gene: Ozzie\_21 Start: 17052, Stop: 17360, Start Num: 5

Candidate Starts for Ozzie\_21:

(Start: 5 @17052 has 93 MA's), (Start: 10 @17085 has 1 MA's), (24, 17199), (34, 17262), (36, 17274), (40, 17322), (43, 17343), (44, 17349),

Gene: OzzyJ\_22 Start: 17036, Stop: 17335, Start Num: 5

Candidate Starts for OzzyJ\_22:

(Start: 5 @17036 has 93 MA's), (14, 17090), (17, 17126), (21, 17168), (23, 17177), (36, 17258), (39, 17282),

Gene: Pablito\_21 Start: 16878, Stop: 17180, Start Num: 5

Candidate Starts for Pablito\_21:

(Start: 5 @16878 has 93 MA's), (23, 17019), (35, 17097), (43, 17166),

Gene: Paedore\_21 Start: 17038, Stop: 17340, Start Num: 5

Candidate Starts for Paedore\_21:

(Start: 5 @17038 has 93 MA's), (20, 17152), (26, 17200), (35, 17257), (43, 17326),

Gene: Paolo\_23 Start: 17435, Stop: 17737, Start Num: 4

Candidate Starts for Paolo\_23:

(Start: 4 @17435 has 2 MA's), (14, 17489), (20, 17549), (21, 17567), (23, 17576), (25, 17591), (43, 17723),

Gene: Pavo\_23 Start: 17754, Stop: 18059, Start Num: 5

Candidate Starts for Pavo\_23:

(Start: 5 @17754 has 93 MA's), (13, 17805), (19, 17859), (22, 17889), (28, 17928), (36, 17976), (42, 18027), (43, 18042), (44, 18048),

Gene: Phettuccine\_21 Start: 17072, Stop: 17380, Start Num: 5

Candidate Starts for Phettuccine\_21:

(Start: 5 @17072 has 93 MA's), (Start: 10 @17105 has 1 MA's), (24, 17219), (34, 17282), (36, 17294), (40, 17342), (43, 17363), (44, 17369),

Gene: Provolone\_22 Start: 17484, Stop: 17789, Start Num: 5

Candidate Starts for Provolone\_22:

(Start: 5 @17484 has 93 MA's), (13, 17535), (19, 17589), (22, 17619), (28, 17658), (36, 17706), (42, 17757), (43, 17772), (44, 17778),

Gene: Puginator\_23 Start: 17480, Stop: 17782, Start Num: 5

Candidate Starts for Puginator\_23:

(Start: 5 @17480 has 93 MA's), (14, 17534), (20, 17594), (21, 17612), (23, 17621), (25, 17636), (31, 17675), (43, 17768),

Gene: R4\_21 Start: 17120, Stop: 17422, Start Num: 5

Candidate Starts for R4\_21:

(Start: 5 @17120 has 93 MA's), (20, 17234), (26, 17282), (43, 17408),

Gene: Rana\_21 Start: 17044, Stop: 17340, Start Num: 5

Candidate Starts for Rana\_21:

(Start: 5 @17044 has 93 MA's), (14, 17095), (21, 17173), (23, 17182), (28, 17215), (30, 17227), (31, 17236), (39, 17287), (43, 17329),

Gene: RedBear\_23 Start: 17311, Stop: 17607, Start Num: 5

Candidate Starts for RedBear\_23:

(Start: 5 @17311 has 93 MA's), (17, 17398), (21, 17440), (23, 17449), (36, 17530), (39, 17554),

Gene: Rusticus\_22 Start: 17223, Stop: 17519, Start Num: 5

Candidate Starts for Rusticus\_22:

(Start: 5 @17223 has 93 MA's), (Start: 8 @17235 has 3 MA's), (12, 17268), (14, 17274), (17, 17310), (21, 17352), (23, 17361), (43, 17508),

Gene: Saftant\_21 Start: 18032, Stop: 18334, Start Num: 5

Candidate Starts for Saftant\_21:

(Start: 5 @18032 has 93 MA's), (12, 18080), (27, 18197), (34, 18242), (35, 18251), (38, 18272), (39, 18278), (43, 18320), (44, 18326),

Gene: SarahRose\_21 Start: 17042, Stop: 17341, Start Num: 5

Candidate Starts for SarahRose\_21:

(Start: 5 @17042 has 93 MA's), (14, 17096), (17, 17132), (21, 17174), (23, 17183), (36, 17264), (39, 17288),

Gene: Snorlax\_21 Start: 17045, Stop: 17344, Start Num: 5

Candidate Starts for Snorlax\_21:

(Start: 5 @17045 has 93 MA's), (14, 17099), (17, 17135), (21, 17177), (23, 17186), (36, 17267), (39, 17291),

Gene: South40\_22 Start: 17311, Stop: 17607, Start Num: 5

Candidate Starts for South40\_22:

(Start: 5 @17311 has 93 MA's), (17, 17398), (21, 17440), (23, 17449), (36, 17530), (39, 17554),

Gene: Speedwell\_28 Start: 19778, Stop: 20083, Start Num: 5

Candidate Starts for Speedwell\_28:

(Start: 5 @19778 has 93 MA's), (Start: 8 @19793 has 3 MA's), (16, 19844), (26, 19940), (27, 19943), (36, 20000), (43, 20066), (44, 20072),

Gene: SqueakyClean\_22 Start: 17040, Stop: 17342, Start Num: 5

Candidate Starts for SqueakyClean\_22:

(Start: 5 @17040 has 93 MA's), (16, 17106), (17, 17130), (23, 17181), (35, 17259), (43, 17328),

Gene: Sujidade\_22 Start: 17350, Stop: 17646, Start Num: 5

Candidate Starts for Sujidade\_22:

(Start: 5 @17350 has 93 MA's), (21, 17479), (28, 17521), (30, 17533), (39, 17593), (43, 17635),

Gene: SunsetPointe\_21 Start: 17062, Stop: 17370, Start Num: 5

Candidate Starts for SunsetPointe\_21:

(Start: 5 @17062 has 93 MA's), (Start: 10 @17095 has 1 MA's), (24, 17209), (34, 17272), (36, 17284), (40, 17332), (43, 17353), (44, 17359),

Gene: Superstar\_24 Start: 18759, Stop: 19064, Start Num: 5

Candidate Starts for Superstar\_24:

(Start: 5 @18759 has 93 MA's), (16, 18825), (17, 18849), (22, 18894), (35, 18978), (42, 19032), (43, 19047), (44, 19053),

Gene: TagePhighter\_22 Start: 17045, Stop: 17344, Start Num: 5

Candidate Starts for TagePhighter\_22:

(Start: 5 @17045 has 93 MA's), (14, 17099), (17, 17135), (21, 17177), (23, 17186), (36, 17267), (39, 17291),

Gene: Tefunt\_21 Start: 17553, Stop: 17858, Start Num: 5

Candidate Starts for Tefunt\_21:

(Start: 5 @17553 has 93 MA's), (16, 17619), (19, 17658), (22, 17688), (35, 17772), (36, 17775), (43, 17841), (44, 17847),

Gene: Thestral\_22 Start: 17008, Stop: 17310, Start Num: 5  
Candidate Starts for Thestral\_22:  
(Start: 5 @17008 has 93 MA's), (20, 17122), (23, 17149), (29, 17188), (43, 17296),

Gene: TinaBelcher\_21 Start: 16956, Stop: 17258, Start Num: 5  
Candidate Starts for TinaBelcher\_21:  
(Start: 5 @16956 has 93 MA's), (20, 17070), (23, 17097), (43, 17244),

Gene: Toma\_21 Start: 17059, Stop: 17355, Start Num: 5  
Candidate Starts for Toma\_21:  
(Start: 5 @17059 has 93 MA's), (14, 17110), (17, 17146), (21, 17188), (26, 17218), (31, 17251), (39, 17302), (43, 17344),

Gene: Triste\_21 Start: 17036, Stop: 17335, Start Num: 5  
Candidate Starts for Triste\_21:  
(Start: 5 @17036 has 93 MA's), (14, 17090), (17, 17126), (21, 17168), (23, 17177), (36, 17258), (39, 17282),

Gene: Triumph\_23 Start: 16957, Stop: 17259, Start Num: 5  
Candidate Starts for Triumph\_23:  
(Start: 5 @16957 has 93 MA's), (16, 17023), (23, 17098), (35, 17176), (43, 17245),

Gene: TrvxScott\_20 Start: 16958, Stop: 17260, Start Num: 5  
Candidate Starts for TrvxScott\_20:  
(Start: 5 @16958 has 93 MA's), (20, 17072), (23, 17099), (43, 17246),

Gene: TuanPN\_21 Start: 17042, Stop: 17341, Start Num: 5  
Candidate Starts for TuanPN\_21:  
(Start: 5 @17042 has 93 MA's), (14, 17096), (17, 17132), (21, 17174), (23, 17183), (36, 17264), (39, 17288),

Gene: Unstoppable\_21 Start: 17063, Stop: 17371, Start Num: 5  
Candidate Starts for Unstoppable\_21:  
(Start: 5 @17063 has 93 MA's), (Start: 10 @17096 has 1 MA's), (24, 17210), (34, 17273), (36, 17285), (40, 17333), (43, 17354), (44, 17360),

Gene: Urza\_22 Start: 17759, Stop: 18076, Start Num: 46  
Candidate Starts for Urza\_22:  
(1, 17006), (2, 17426), (6, 17462), (Start: 46 @17759 has 4 MA's), (47, 17795), (48, 17840), (49, 17846), (51, 17906), (52, 17909), (53, 17936), (54, 18059),

Gene: Urza\_21 Start: 17433, Stop: 17762, Start Num: 3  
Candidate Starts for Urza\_21:  
(Start: 3 @17433 has 4 MA's), (9, 17475), (11, 17502), (16, 17523), (18, 17559), (43, 17745),

Gene: Vanseggelen\_26 Start: 17414, Stop: 17719, Start Num: 5  
Candidate Starts for Vanseggelen\_26:  
(Start: 5 @17414 has 93 MA's), (13, 17465), (18, 17516), (25, 17570), (26, 17576), (27, 17579), (28, 17588), (36, 17636), (42, 17687), (43, 17702), (44, 17708),

Gene: Verabelle\_22 Start: 17747, Stop: 18052, Start Num: 5  
Candidate Starts for Verabelle\_22:

(Start: 5 @17747 has 93 MA's), (13, 17798), (17, 17837), (25, 17903), (27, 17912), (28, 17921), (36, 17969), (42, 18020), (43, 18035), (44, 18041),

Gene: Verse\_21 Start: 18046, Stop: 18351, Start Num: 5

Candidate Starts for Verse\_21:

(Start: 5 @18046 has 93 MA's), (13, 18097), (25, 18202), (28, 18220), (36, 18268), (43, 18334), (44, 18340),

Gene: VieEnRose\_21 Start: 17499, Stop: 17828, Start Num: 3

Candidate Starts for VieEnRose\_21:

(Start: 3 @17499 has 4 MA's), (9, 17541), (11, 17568), (16, 17589), (18, 17625), (31, 17718), (43, 17811), (44, 17817),

Gene: VieEnRose\_22 Start: 17825, Stop: 18142, Start Num: 46

Candidate Starts for VieEnRose\_22:

(32, 17720), (Start: 46 @17825 has 4 MA's), (47, 17861), (48, 17906), (50, 17930), (52, 17975), (53, 18002), (54, 18125),

Gene: Werner\_21 Start: 17046, Stop: 17345, Start Num: 5

Candidate Starts for Werner\_21:

(Start: 5 @17046 has 93 MA's), (14, 17100), (17, 17136), (21, 17178), (23, 17187), (36, 17268), (39, 17292),

Gene: Whatever\_21 Start: 17046, Stop: 17345, Start Num: 5

Candidate Starts for Whatever\_21:

(Start: 5 @17046 has 93 MA's), (14, 17100), (17, 17136), (21, 17178), (23, 17187), (36, 17268), (39, 17292),

Gene: Yasdni1\_21 Start: 17038, Stop: 17337, Start Num: 5

Candidate Starts for Yasdni1\_21:

(Start: 5 @17038 has 93 MA's), (14, 17092), (17, 17128), (21, 17170), (23, 17179), (36, 17260), (39, 17284),

Gene: Yosif\_22 Start: 17987, Stop: 18289, Start Num: 5

Candidate Starts for Yosif\_22:

(Start: 5 @17987 has 93 MA's), (7, 17996), (36, 18209), (37, 18224), (42, 18260),

Gene: Zainub\_23 Start: 17393, Stop: 17695, Start Num: 4

Candidate Starts for Zainub\_23:

(Start: 4 @17393 has 2 MA's), (14, 17447), (20, 17507), (21, 17525), (23, 17534), (25, 17549), (43, 17681),

Gene: Zemlya\_22 Start: 17070, Stop: 17366, Start Num: 5

Candidate Starts for Zemlya\_22:

(Start: 5 @17070 has 93 MA's), (14, 17121), (17, 17157), (21, 17199), (26, 17229), (31, 17262), (33, 17265), (39, 17313), (43, 17355),

Gene: phiCAM\_22 Start: 19709, Stop: 20017, Start Num: 5

Candidate Starts for phiCAM\_22:

(Start: 5 @19709 has 93 MA's), (7, 19718), (Start: 10 @19742 has 1 MA's), (16, 19775), (19, 19814), (24, 19856), (34, 19919), (36, 19931), (42, 19985), (43, 20000), (44, 20006),

Gene: phiHau3\_23 Start: 17729, Stop: 18028, Start Num: 5

Candidate Starts for phiHau3\_23:

(Start: 5 @17729 has 93 MA's), (Start: 8 @17741 has 3 MA's), (14, 17780), (16, 17792), (17, 17816),  
(25, 17882), (43, 18014), (45, 18023),