



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 212452 Report

This analysis was run 02/22/25 on database version 588.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 212452 has 114 members, 7 are drafts.

Phages represented in each track:

- Track 1 : Yasdni1\_14, TuanPN\_14, Maneekul\_14, Ejemplo\_14
- Track 2 : Bovely\_14, Esperer\_14, SunsetPointe\_14, Izzy\_15, Indigo\_14, BryanRecycles\_15, Oliynyk\_15, Rusticus\_15, Nerdos\_14, Eddasa\_15, Ozzie\_14, Caliburn\_14, Hydra\_16, Leviticus\_14, Unstoppable\_14, Legacy\_14, BeardedLady\_15, Phettuccine\_14, Jash\_15
- Track 3 : Lannister\_15
- Track 4 : Werner\_14, Hippo\_14, Snorlax\_14, BarryBee\_16, Emaanora\_16, Dwayne\_14
- Track 5 : Whatever\_14, Chucky\_14, SarahRose\_14, TagePhighter\_15, Asten\_14, Triste\_14
- Track 6 : Goby\_14, Godpower\_15, Sujidade\_15, Lika\_14, Danzina\_15, Toma\_14
- Track 7 : Dattran\_15, Brataylor\_15, Nanodon\_16, Zemlya\_15, Nabi\_14, Lorelei\_14, Rana\_14, Celeste\_14
- Track 8 : OzzyJ\_15
- Track 9 : Katalie\_15, RedBear\_16, South40\_15
- Track 10 : Aaronocolus\_14
- Track 11 : EnochSoames\_15
- Track 12 : TrvxScott\_13
- Track 13 : Hank144\_15
- Track 14 : Triumph\_16, GirlDinner\_14, Janus\_15, Axiom\_15, Animus\_15, SqueakyClean\_15
- Track 15 : Puginator\_16
- Track 16 : Paolo\_16
- Track 17 : Marav\_17
- Track 18 : Omar\_15
- Track 19 : Daudau\_14
- Track 20 : Caelum\_15
- Track 21 : ELB20\_13, R4\_14
- Track 22 : Alvy\_16, BartholomewSD\_16
- Track 23 : Zainub\_16
- Track 24 : Amethyst\_14
- Track 25 : Paedore\_14, Loofah\_15
- Track 26 : Haizum\_14, Nishikigoi\_14, Diane\_14, Tefunt\_14

- Track 27 : Jevington\_16
- Track 28 : Issmi\_15
- Track 29 : Thestral\_15
- Track 30 : Bowden\_15, TinaBelcher\_14
- Track 31 : Andris\_14
- Track 32 : Superstar\_17
- Track 33 : Pablito\_14
- Track 34 : Pavo\_15, ElGato\_15, Provolone\_15
- Track 35 : Vanseggelen\_18
- Track 36 : Verse\_14, Amela\_14
- Track 37 : Conan\_15
- Track 38 : Yosif\_15
- Track 39 : Speedwell\_19
- Track 40 : Celery\_17
- Track 41 : Kaine\_14, Alsaber\_15
- Track 42 : Verabelle\_15
- Track 43 : phiCAM\_15
- Track 44 : Saftant\_14
- Track 45 : Dexers\_13
- Track 46 : GreenWeasel\_16, BroPlease\_15
- Track 47 : phiHau3\_16
- Track 48 : VieEnRose\_14
- Track 49 : Itza\_14, Celia\_14, Urza\_14
- Track 50 : Attoomi\_11

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

The start number called the most often in the published annotations is 4, it was called in 106 of the 107 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

• Aaronocolus\_14, Alsaber\_15, Alvy\_16, Amela\_14, Amethyst\_14, Andris\_14, Animus\_15, Asten\_14, Axiom\_15, BarryBee\_16, BartholomewSD\_16, BeardedLady\_15, Bovely\_14, Bowden\_15, Brataylor\_15, BroPlease\_15, BryanRecycles\_15, Caelum\_15, Caliburn\_14, Celery\_17, Celeste\_14, Celia\_14, Chucky\_14, Conan\_15, Danzina\_15, Dattran\_15, Daudau\_14, Dexers\_13, Diane\_14, Dwayne\_14, ELB20\_13, Eddasa\_15, Ejemplo\_14, ElGato\_15, Emaanora\_16, EnochSoames\_15, Esperer\_14, GirlDinner\_14, Goby\_14, Godpower\_15, GreenWeasel\_16, Haizum\_14, Hank144\_15, Hippo\_14, Hydra\_16, Indigo\_14, Issmi\_15, Itza\_14, Izzy\_15, Janus\_15, Jash\_15, Jevington\_16, Kaine\_14, Katalie\_15, Lannister\_15, Legacy\_14, Leviticus\_14, Lika\_14, Loofah\_15, Lorelei\_14, Maneekul\_14, Marav\_17, Nabi\_14, Nanodon\_16, Nerdos\_14, Nishikigoi\_14, Oliynyk\_15, Omar\_15, Ozzie\_14, OzzyJ\_15, Pablito\_14, Paedore\_14, Paolo\_16, Pavo\_15, Phettuccine\_14, Provolone\_15, Puginator\_16, R4\_14, Rana\_14, RedBear\_16, Rusticus\_15, Saftant\_14, SarahRose\_14, Snorlax\_14, South40\_15, Speedwell\_19, SqueakyClean\_15, Sujidade\_15, SunsetPointe\_14, Superstar\_17, TagePhighter\_15, Tefunt\_14, Thestral\_15, TinaBelcher\_14, Toma\_14, Triste\_14, Triumph\_16, TrvxScott\_13, TuanPN\_14, Unstoppable\_14, Urza\_14, Vanseggelen\_18, Verabelle\_15, Verse\_14, VieEnRose\_14, Werner\_14, Whatever\_14, Yasdnil\_14, Yosif\_15, Zainub\_16, Zemlya\_15, phiCAM\_15,

phiHau3\_16,

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

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

- Attoomi\_11,

### Summary by start number:

Start 4:

- Found in 113 of 114 ( 99.1% ) of genes in pham
- Manual Annotations of this start: 106 of 107
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_14 (BD1), Alsaber\_15 (BD3), Alvy\_16 (BD2), Amela\_14 (BD3), Amethyst\_14 (BD2), Andris\_14 (BD2), Animus\_15 (BD2), Asten\_14 (BD1), Axiom\_15 (BD2), BarryBee\_16 (BD1), BartholomewSD\_16 (BD2), BeardedLady\_15 (BD1), Bovely\_14 (BD1), Bowden\_15 (BD2), Brataylor\_15 (BD1), BroPlease\_15 (BD4), BryanRecycles\_15 (BD1), Caelum\_15 (BD2), Caliburn\_14 (BD1), Celery\_17 (BD3), Celeste\_14 (BD1), Celia\_14 (BD6), Chucky\_14 (BD1), Conan\_15 (BD3), Danzina\_15 (BD1), Dattran\_15 (BD1), Daudau\_14 (BD2), Dexers\_13 (BD3), Diane\_14 (BD2), Dwayne\_14 (BD1), ELB20\_13 (BD2), Eddasa\_15 (BD1), Ejemplo\_14 (BD1), ElGato\_15 (BD3), Emaanora\_16 (BD1), EnochSoames\_15 (BD1), Esperer\_14 (BD1), GirlDinner\_14 (BD2), Goby\_14 (BD1), Godpower\_15 (BD1), GreenWeasel\_16 (BD4), Haizum\_14 (BD2), Hank144\_15 (BD2), Hippo\_14 (BD1), Hydra\_16 (BD1), Indigo\_14 (BD1), Issmi\_15 (BD2), Itza\_14 (BD6), Izzy\_15 (BD1), Janus\_15 (BD2), Jash\_15 (BD1), Jevington\_16 (BD2), Kaine\_14 (BD3), Katalie\_15 (BD1), Lannister\_15 (BD1), Legacy\_14 (BD1), Leviticus\_14 (BD1), Lika\_14 (BD1), Loofah\_15 (BD2), Lorelei\_14 (BD1), Maneekul\_14 (BD1), Marav\_17 (BD2), Nabi\_14 (BD1), Nanodon\_16 (BD1), Nerdos\_14 (BD1), Nishikigoi\_14 (BD2), Oliynyk\_15 (BD1), Omar\_15 (BD2), Ozzie\_14 (BD1), OzzyJ\_15 (BD1), Pablito\_14 (BD2), Paedore\_14 (BD2), Paolo\_16 (BD2), Pavo\_15 (BD3), Phettuccine\_14 (BD1), Provolone\_15 (BD3), Puginator\_16 (BD2), R4\_14 (BD2), Rana\_14 (BD1), RedBear\_16 (BD1), Rusticus\_15 (BD1), Saftant\_14 (BD3), SarahRose\_14 (BD1), Snorlax\_14 (BD1), South40\_15 (BD1), Speedwell\_19 (BD3), SqueakyClean\_15 (BD2), Sujidade\_15 (BD1), SunsetPointe\_14 (BD1), Superstar\_17 (BD2), TAgePhighter\_15 (BD1), Tefunt\_14 (BD2), Thestral\_15 (BD2), TinaBelcher\_14 (BD2), Toma\_14 (BD1), Triste\_14 (BD1), Triumph\_16 (BD2), TrvxScott\_13 (BD2), TuanPN\_14 (BD1), Unstoppable\_14 (BD1), Urza\_14 (BD6), Vanseggelen\_18 (BD3), Verabelle\_15 (BD3), Verse\_14 (BD3), VieEnRose\_14 (BD6), Werner\_14 (BD1), Whatever\_14 (BD1), Yasdnil\_14 (BD1), Yosif\_15 (BD3), Zainub\_16 (BD2), Zemlya\_15 (BD1), phiCAM\_15 (BD3), phiHau3\_16 (BD4),

Start 5:

- Found in 1 of 114 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 107
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Attoomi\_11 (singleton),

### Summary by clusters:

There are 6 clusters represented in this pham: singleton, BD4, BD6, BD1, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 4 was manually annotated 55 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 4 was manually annotated 32 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 4 was manually annotated 12 times for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 4 was manually annotated 3 times for cluster BD4.

Info for manual annotations of cluster BD6:

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

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

Gene: Aaronocolus\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Aaronocolus\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: Alsaber\_15 Start: 9636, Stop: 10139, Start Num: 4

Candidate Starts for Alsaber\_15:

(Start: 4 @9636 has 106 MA's), (7, 9675), (12, 9705), (14, 9735), (24, 9846), (35, 9978), (40, 10062),

Gene: Alvy\_16 Start: 9584, Stop: 10081, Start Num: 4

Candidate Starts for Alvy\_16:

(Start: 4 @9584 has 106 MA's), (10, 9644), (12, 9653), (14, 9683), (25, 9797), (29, 9866),

Gene: Amela\_14 Start: 9742, Stop: 10245, Start Num: 4

Candidate Starts for Amela\_14:

(Start: 4 @9742 has 106 MA's), (6, 9772), (7, 9781), (24, 9952), (35, 10084), (40, 10168),

Gene: Amethyst\_14 Start: 9406, Stop: 9903, Start Num: 4

Candidate Starts for Amethyst\_14:

(Start: 4 @9406 has 106 MA's), (10, 9466), (14, 9505), (25, 9619), (34, 9721),

Gene: Andris\_14 Start: 9391, Stop: 9888, Start Num: 4

Candidate Starts for Andris\_14:

(Start: 4 @9391 has 106 MA's), (14, 9490), (17, 9529), (25, 9604), (33, 9703), (35, 9733),

Gene: Animus\_15 Start: 9744, Stop: 10241, Start Num: 4

Candidate Starts for Animus\_15:

(Start: 4 @9744 has 106 MA's), (14, 9843), (17, 9882), (25, 9957), (33, 10056),

Gene: Asten\_14 Start: 9533, Stop: 10036, Start Num: 4

Candidate Starts for Asten\_14:

(Start: 4 @9533 has 106 MA's), (23, 9740), (34, 9848), (35, 9875), (36, 9881), (38, 9932), (40, 9959),

Gene: Attoomi\_11 Start: 7560, Stop: 7970, Start Num: 5

Candidate Starts for Attoomi\_11:

(Start: 5 @7560 has 1 MA's), (8, 7581), (10, 7593), (11, 7596), (15, 7638), (18, 7677), (19, 7680), (20, 7692), (22, 7728), (26, 7791), (28, 7800), (37, 7869), (41, 7947),

Gene: Axiom\_15 Start: 9429, Stop: 9926, Start Num: 4

Candidate Starts for Axiom\_15:

(Start: 4 @9429 has 106 MA's), (14, 9528), (17, 9567), (25, 9642), (33, 9741),

Gene: BarryBee\_16 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for BarryBee\_16:

(3, 9459), (Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: BartholomewSD\_16 Start: 9584, Stop: 10081, Start Num: 4

Candidate Starts for BartholomewSD\_16:

(Start: 4 @9584 has 106 MA's), (10, 9644), (12, 9653), (14, 9683), (25, 9797), (29, 9866),

Gene: BeardedLady\_15 Start: 9824, Stop: 10327, Start Num: 4

Candidate Starts for BeardedLady\_15:

(Start: 4 @9824 has 106 MA's), (6, 9854), (12, 9893), (17, 9962), (27, 10097), (32, 10133), (34, 10139), (35, 10166), (36, 10172), (38, 10223), (40, 10250),

Gene: Bovely\_14 Start: 9583, Stop: 10086, Start Num: 4

Candidate Starts for Bovely\_14:

(Start: 4 @9583 has 106 MA's), (6, 9613), (12, 9652), (17, 9721), (27, 9856), (32, 9892), (34, 9898), (35, 9925), (36, 9931), (38, 9982), (40, 10009),

Gene: Bowden\_15 Start: 9501, Stop: 9998, Start Num: 4

Candidate Starts for Bowden\_15:

(Start: 4 @9501 has 106 MA's), (10, 9561), (12, 9570), (14, 9600), (25, 9714), (29, 9783), (31, 9801),

Gene: Brataylor\_15 Start: 9546, Stop: 10049, Start Num: 4

Candidate Starts for Brataylor\_15:

(Start: 4 @9546 has 106 MA's), (23, 9753), (34, 9861), (35, 9888), (36, 9894), (38, 9945), (40, 9972),

Gene: BroPlease\_15 Start: 9718, Stop: 10221, Start Num: 4

Candidate Starts for BroPlease\_15:

(Start: 4 @9718 has 106 MA's), (9, 9775), (23, 9925), (25, 9931), (27, 9991), (36, 10066), (40, 10144),

Gene: BryanRecycles\_15 Start: 9740, Stop: 10243, Start Num: 4

Candidate Starts for BryanRecycles\_15:

(Start: 4 @9740 has 106 MA's), (6, 9770), (12, 9809), (17, 9878), (27, 10013), (32, 10049), (34, 10055), (35, 10082), (36, 10088), (38, 10139), (40, 10166),

Gene: Caelum\_15 Start: 9377, Stop: 9874, Start Num: 4

Candidate Starts for Caelum\_15:

(1, 8885), (Start: 4 @9377 has 106 MA's), (10, 9437), (25, 9590), (27, 9650), (28, 9656),

Gene: Caliburn\_14 Start: 9557, Stop: 10060, Start Num: 4

Candidate Starts for Caliburn\_14:

(Start: 4 @9557 has 106 MA's), (6, 9587), (12, 9626), (17, 9695), (27, 9830), (32, 9866), (34, 9872), (35, 9899), (36, 9905), (38, 9956), (40, 9983),

Gene: Celery\_17 Start: 9591, Stop: 10094, Start Num: 4  
Candidate Starts for Celery\_17:  
(Start: 4 @9591 has 106 MA's), (7, 9630), (12, 9660), (24, 9801), (40, 10017),

Gene: Celeste\_14 Start: 9544, Stop: 10047, Start Num: 4  
Candidate Starts for Celeste\_14:  
(Start: 4 @9544 has 106 MA's), (23, 9751), (34, 9859), (35, 9886), (36, 9892), (38, 9943), (40, 9970),

Gene: Celia\_14 Start: 9861, Stop: 10364, Start Num: 4  
Candidate Starts for Celia\_14:  
(Start: 4 @9861 has 106 MA's), (10, 9921), (12, 9930), (13, 9954), (14, 9960), (23, 10068), (25, 10074),  
(29, 10143), (34, 10176), (35, 10203), (38, 10260), (40, 10287),

Gene: Chucky\_14 Start: 9541, Stop: 10044, Start Num: 4  
Candidate Starts for Chucky\_14:  
(Start: 4 @9541 has 106 MA's), (23, 9748), (34, 9856), (35, 9883), (36, 9889), (38, 9940), (40, 9967),

Gene: Conan\_15 Start: 9343, Stop: 9846, Start Num: 4  
Candidate Starts for Conan\_15:  
(Start: 4 @9343 has 106 MA's), (7, 9382), (12, 9412), (24, 9553), (35, 9685), (40, 9769),

Gene: Danzina\_15 Start: 9748, Stop: 10251, Start Num: 4  
Candidate Starts for Danzina\_15:  
(Start: 4 @9748 has 106 MA's), (23, 9955), (34, 10063), (35, 10090), (36, 10096), (38, 10147), (40,  
10174),

Gene: Dattran\_15 Start: 9543, Stop: 10046, Start Num: 4  
Candidate Starts for Dattran\_15:  
(Start: 4 @9543 has 106 MA's), (23, 9750), (34, 9858), (35, 9885), (36, 9891), (38, 9942), (40, 9969),

Gene: Daudau\_14 Start: 9488, Stop: 9985, Start Num: 4  
Candidate Starts for Daudau\_14:  
(Start: 4 @9488 has 106 MA's), (6, 9518), (10, 9548), (12, 9557), (32, 9797), (38, 9887),

Gene: Dexers\_13 Start: 9339, Stop: 9842, Start Num: 4  
Candidate Starts for Dexers\_13:  
(Start: 4 @9339 has 106 MA's), (7, 9378), (12, 9408), (14, 9438), (24, 9549), (35, 9681), (40, 9765),

Gene: Diane\_14 Start: 9405, Stop: 9902, Start Num: 4  
Candidate Starts for Diane\_14:  
(Start: 4 @9405 has 106 MA's), (10, 9465), (14, 9504), (25, 9618), (29, 9687), (34, 9720), (38, 9804),

Gene: Dwayne\_14 Start: 9540, Stop: 10043, Start Num: 4  
Candidate Starts for Dwayne\_14:  
(3, 9459), (Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939),  
(40, 9966),

Gene: ELB20\_13 Start: 9516, Stop: 10013, Start Num: 4  
Candidate Starts for ELB20\_13:  
(Start: 4 @9516 has 106 MA's), (10, 9576), (12, 9585), (17, 9654), (23, 9723), (30, 9801),

Gene: Eddasa\_15 Start: 9740, Stop: 10243, Start Num: 4  
Candidate Starts for Eddasa\_15:

(Start: 4 @9740 has 106 MA's), (6, 9770), (12, 9809), (17, 9878), (27, 10013), (32, 10049), (34, 10055), (35, 10082), (36, 10088), (38, 10139), (40, 10166),

Gene: Ejemplo\_14 Start: 9543, Stop: 10046, Start Num: 4

Candidate Starts for Ejemplo\_14:

(Start: 4 @9543 has 106 MA's), (32, 9852), (34, 9858), (35, 9885), (36, 9891), (38, 9942), (40, 9969),

Gene: ElGato\_15 Start: 9346, Stop: 9849, Start Num: 4

Candidate Starts for ElGato\_15:

(Start: 4 @9346 has 106 MA's), (7, 9385), (12, 9415), (24, 9556), (35, 9688), (40, 9772),

Gene: Emaanora\_16 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for Emaanora\_16:

(3, 9459), (Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: EnochSoames\_15 Start: 9736, Stop: 10239, Start Num: 4

Candidate Starts for EnochSoames\_15:

(Start: 4 @9736 has 106 MA's), (6, 9766), (12, 9805), (17, 9874), (27, 10009), (34, 10051), (35, 10078), (36, 10084), (38, 10135), (40, 10162),

Gene: Esperer\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Esperer\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: GirlDinner\_14 Start: 9406, Stop: 9903, Start Num: 4

Candidate Starts for GirlDinner\_14:

(Start: 4 @9406 has 106 MA's), (14, 9505), (17, 9544), (25, 9619), (33, 9718),

Gene: Goby\_14 Start: 9546, Stop: 10049, Start Num: 4

Candidate Starts for Goby\_14:

(Start: 4 @9546 has 106 MA's), (23, 9753), (34, 9861), (35, 9888), (36, 9894), (38, 9945), (40, 9972),

Gene: Godpower\_15 Start: 9561, Stop: 10064, Start Num: 4

Candidate Starts for Godpower\_15:

(Start: 4 @9561 has 106 MA's), (23, 9768), (34, 9876), (35, 9903), (36, 9909), (38, 9960), (40, 9987),

Gene: GreenWeasel\_16 Start: 9727, Stop: 10230, Start Num: 4

Candidate Starts for GreenWeasel\_16:

(Start: 4 @9727 has 106 MA's), (9, 9784), (23, 9934), (25, 9940), (27, 10000), (36, 10075), (40, 10153),

Gene: Haizum\_14 Start: 9435, Stop: 9932, Start Num: 4

Candidate Starts for Haizum\_14:

(Start: 4 @9435 has 106 MA's), (10, 9495), (14, 9534), (25, 9648), (29, 9717), (34, 9750), (38, 9834),

Gene: Hank144\_15 Start: 9675, Stop: 10175, Start Num: 4

Candidate Starts for Hank144\_15:

(Start: 4 @9675 has 106 MA's), (14, 9774), (25, 9888), (30, 9960), (33, 9987), (40, 10101),

Gene: Hippo\_14 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for Hippo\_14:



(3, 9459), (Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: Hydra\_16 Start: 10105, Stop: 10608, Start Num: 4

Candidate Starts for Hydra\_16:

(Start: 4 @10105 has 106 MA's), (6, 10135), (12, 10174), (17, 10243), (27, 10378), (32, 10414), (34, 10420), (35, 10447), (36, 10453), (38, 10504), (40, 10531),

Gene: Indigo\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Indigo\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: Issmi\_15 Start: 9706, Stop: 10203, Start Num: 4

Candidate Starts for Issmi\_15:

(Start: 4 @9706 has 106 MA's), (8, 9754), (10, 9766), (25, 9919), (29, 9988), (34, 10021), (40, 10132),

Gene: Itza\_14 Start: 9784, Stop: 10287, Start Num: 4

Candidate Starts for Itza\_14:

(Start: 4 @9784 has 106 MA's), (10, 9844), (12, 9853), (13, 9877), (14, 9883), (23, 9991), (25, 9997), (29, 10066), (34, 10099), (35, 10126), (38, 10183), (40, 10210),

Gene: Izzy\_15 Start: 9787, Stop: 10290, Start Num: 4

Candidate Starts for Izzy\_15:

(Start: 4 @9787 has 106 MA's), (6, 9817), (12, 9856), (17, 9925), (27, 10060), (32, 10096), (34, 10102), (35, 10129), (36, 10135), (38, 10186), (40, 10213),

Gene: Janus\_15 Start: 9744, Stop: 10241, Start Num: 4

Candidate Starts for Janus\_15:

(Start: 4 @9744 has 106 MA's), (14, 9843), (17, 9882), (25, 9957), (33, 10056),

Gene: Jash\_15 Start: 9740, Stop: 10243, Start Num: 4

Candidate Starts for Jash\_15:

(Start: 4 @9740 has 106 MA's), (6, 9770), (12, 9809), (17, 9878), (27, 10013), (32, 10049), (34, 10055), (35, 10082), (36, 10088), (38, 10139), (40, 10166),

Gene: Jevington\_16 Start: 10032, Stop: 10529, Start Num: 4

Candidate Starts for Jevington\_16:

(Start: 4 @10032 has 106 MA's), (10, 10092), (12, 10101), (14, 10131), (29, 10314),

Gene: Kaine\_14 Start: 9339, Stop: 9842, Start Num: 4

Candidate Starts for Kaine\_14:

(Start: 4 @9339 has 106 MA's), (7, 9378), (12, 9408), (14, 9438), (24, 9549), (35, 9681), (40, 9765),

Gene: Katalie\_15 Start: 9816, Stop: 10319, Start Num: 4

Candidate Starts for Katalie\_15:

(Start: 4 @9816 has 106 MA's), (7, 9855), (27, 10089), (34, 10131), (35, 10158), (36, 10164), (38, 10215), (40, 10242),

Gene: Lannister\_15 Start: 9564, Stop: 10067, Start Num: 4

Candidate Starts for Lannister\_15:

(Start: 4 @9564 has 106 MA's), (16, 9672), (23, 9771), (35, 9906), (36, 9912), (38, 9963), (40, 9990),

Gene: Legacy\_14 Start: 9548, Stop: 10051, Start Num: 4

Candidate Starts for Legacy\_14:

(Start: 4 @9548 has 106 MA's), (6, 9578), (12, 9617), (17, 9686), (27, 9821), (32, 9857), (34, 9863), (35, 9890), (36, 9896), (38, 9947), (40, 9974),

Gene: Leviticus\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Leviticus\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: Lika\_14 Start: 9562, Stop: 10065, Start Num: 4

Candidate Starts for Lika\_14:

(Start: 4 @9562 has 106 MA's), (23, 9769), (34, 9877), (35, 9904), (36, 9910), (38, 9961), (40, 9988),

Gene: Loofah\_15 Start: 9547, Stop: 10044, Start Num: 4

Candidate Starts for Loofah\_15:

(Start: 4 @9547 has 106 MA's), (10, 9607), (12, 9616), (17, 9685), (23, 9754), (27, 9820), (30, 9832),

Gene: Lorelei\_14 Start: 9534, Stop: 10037, Start Num: 4

Candidate Starts for Lorelei\_14:

(Start: 4 @9534 has 106 MA's), (23, 9741), (34, 9849), (35, 9876), (36, 9882), (38, 9933), (40, 9960),

Gene: Maneekul\_14 Start: 9542, Stop: 10045, Start Num: 4

Candidate Starts for Maneekul\_14:

(Start: 4 @9542 has 106 MA's), (32, 9851), (34, 9857), (35, 9884), (36, 9890), (38, 9941), (40, 9968),

Gene: Marav\_17 Start: 10382, Stop: 10879, Start Num: 4

Candidate Starts for Marav\_17:

(Start: 4 @10382 has 106 MA's), (8, 10430), (10, 10442), (14, 10481), (29, 10664), (39, 10796), (40, 10808),

Gene: Nabi\_14 Start: 9534, Stop: 10037, Start Num: 4

Candidate Starts for Nabi\_14:

(Start: 4 @9534 has 106 MA's), (23, 9741), (34, 9849), (35, 9876), (36, 9882), (38, 9933), (40, 9960),

Gene: Nanodon\_16 Start: 9736, Stop: 10239, Start Num: 4

Candidate Starts for Nanodon\_16:

(Start: 4 @9736 has 106 MA's), (23, 9943), (34, 10051), (35, 10078), (36, 10084), (38, 10135), (40, 10162),

Gene: Nerdos\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Nerdos\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: Nishikigoi\_14 Start: 9435, Stop: 9932, Start Num: 4

Candidate Starts for Nishikigoi\_14:

(Start: 4 @9435 has 106 MA's), (10, 9495), (14, 9534), (25, 9648), (29, 9717), (34, 9750), (38, 9834),

Gene: Oliynyk\_15 Start: 9740, Stop: 10243, Start Num: 4

Candidate Starts for Oliynyk\_15:

(Start: 4 @9740 has 106 MA's), (6, 9770), (12, 9809), (17, 9878), (27, 10013), (32, 10049), (34, 10055), (35, 10082), (36, 10088), (38, 10139), (40, 10166),

Gene: Omar\_15 Start: 9669, Stop: 10166, Start Num: 4

Candidate Starts for Omar\_15:

(Start: 4 @9669 has 106 MA's), (10, 9729), (14, 9768), (25, 9882), (29, 9951), (34, 9984), (40, 10095),

Gene: Ozzie\_14 Start: 9557, Stop: 10060, Start Num: 4

Candidate Starts for Ozzie\_14:

(Start: 4 @9557 has 106 MA's), (6, 9587), (12, 9626), (17, 9695), (27, 9830), (32, 9866), (34, 9872), (35, 9899), (36, 9905), (38, 9956), (40, 9983),

Gene: OzzyJ\_15 Start: 9534, Stop: 10037, Start Num: 4

Candidate Starts for OzzyJ\_15:

(Start: 4 @9534 has 106 MA's), (23, 9741), (34, 9849), (35, 9876), (36, 9882), (38, 9933), (40, 9960),

Gene: Pablito\_14 Start: 9405, Stop: 9902, Start Num: 4

Candidate Starts for Pablito\_14:

(3, 9321), (Start: 4 @9405 has 106 MA's), (12, 9474), (14, 9504), (17, 9543), (25, 9618), (29, 9687),

Gene: Paedore\_14 Start: 9547, Stop: 10044, Start Num: 4

Candidate Starts for Paedore\_14:

(Start: 4 @9547 has 106 MA's), (10, 9607), (12, 9616), (17, 9685), (23, 9754), (27, 9820), (30, 9832),

Gene: Paolo\_16 Start: 10047, Stop: 10544, Start Num: 4

Candidate Starts for Paolo\_16:

(2, 9681), (Start: 4 @10047 has 106 MA's), (10, 10107), (14, 10146), (29, 10329),

Gene: Pavo\_15 Start: 9616, Stop: 10119, Start Num: 4

Candidate Starts for Pavo\_15:

(Start: 4 @9616 has 106 MA's), (7, 9655), (12, 9685), (24, 9826), (35, 9958), (40, 10042),

Gene: Phettuccine\_14 Start: 9577, Stop: 10080, Start Num: 4

Candidate Starts for Phettuccine\_14:

(Start: 4 @9577 has 106 MA's), (6, 9607), (12, 9646), (17, 9715), (27, 9850), (32, 9886), (34, 9892), (35, 9919), (36, 9925), (38, 9976), (40, 10003),

Gene: Provolone\_15 Start: 9346, Stop: 9849, Start Num: 4

Candidate Starts for Provolone\_15:

(Start: 4 @9346 has 106 MA's), (7, 9385), (12, 9415), (24, 9556), (35, 9688), (40, 9772),

Gene: Puginator\_16 Start: 10005, Stop: 10502, Start Num: 4

Candidate Starts for Puginator\_16:

(Start: 4 @10005 has 106 MA's), (10, 10065), (14, 10104), (29, 10287), (39, 10419), (40, 10431),

Gene: R4\_14 Start: 9527, Stop: 10024, Start Num: 4

Candidate Starts for R4\_14:

(Start: 4 @9527 has 106 MA's), (10, 9587), (12, 9596), (17, 9665), (23, 9734), (30, 9812),

Gene: Rana\_14 Start: 9534, Stop: 10037, Start Num: 4

Candidate Starts for Rana\_14:

(Start: 4 @9534 has 106 MA's), (23, 9741), (34, 9849), (35, 9876), (36, 9882), (38, 9933), (40, 9960),

Gene: RedBear\_16 Start: 9816, Stop: 10319, Start Num: 4

Candidate Starts for RedBear\_16:

(Start: 4 @9816 has 106 MA's), (7, 9855), (27, 10089), (34, 10131), (35, 10158), (36, 10164), (38, 10215), (40, 10242),

Gene: Rusticus\_15 Start: 9740, Stop: 10243, Start Num: 4

Candidate Starts for Rusticus\_15:

(Start: 4 @9740 has 106 MA's), (6, 9770), (12, 9809), (17, 9878), (27, 10013), (32, 10049), (34, 10055), (35, 10082), (36, 10088), (38, 10139), (40, 10166),

Gene: Saftant\_14 Start: 9638, Stop: 10141, Start Num: 4

Candidate Starts for Saftant\_14:

(3, 9557), (Start: 4 @9638 has 106 MA's), (6, 9668), (14, 9737), (27, 9911), (28, 9917), (34, 9953), (35, 9980), (40, 10064),

Gene: SarahRose\_14 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for SarahRose\_14:

(Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: Snorlax\_14 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for Snorlax\_14:

(3, 9459), (Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: South40\_15 Start: 9816, Stop: 10319, Start Num: 4

Candidate Starts for South40\_15:

(Start: 4 @9816 has 106 MA's), (7, 9855), (27, 10089), (34, 10131), (35, 10158), (36, 10164), (38, 10215), (40, 10242),

Gene: Speedwell\_19 Start: 11362, Stop: 11865, Start Num: 4

Candidate Starts for Speedwell\_19:

(Start: 4 @11362 has 106 MA's), (14, 11461), (27, 11635), (34, 11677), (35, 11704), (40, 11788),

Gene: SqueakyClean\_15 Start: 9670, Stop: 10167, Start Num: 4

Candidate Starts for SqueakyClean\_15:

(Start: 4 @9670 has 106 MA's), (14, 9769), (17, 9808), (25, 9883), (33, 9982),

Gene: Sujidade\_15 Start: 9838, Stop: 10341, Start Num: 4

Candidate Starts for Sujidade\_15:

(Start: 4 @9838 has 106 MA's), (23, 10045), (34, 10153), (35, 10180), (36, 10186), (38, 10237), (40, 10264),

Gene: SunsetPointe\_14 Start: 9567, Stop: 10070, Start Num: 4

Candidate Starts for SunsetPointe\_14:

(Start: 4 @9567 has 106 MA's), (6, 9597), (12, 9636), (17, 9705), (27, 9840), (32, 9876), (34, 9882), (35, 9909), (36, 9915), (38, 9966), (40, 9993),

Gene: Superstar\_17 Start: 10563, Stop: 11060, Start Num: 4

Candidate Starts for Superstar\_17:

(Start: 4 @10563 has 106 MA's), (10, 10623), (25, 10776), (29, 10845), (34, 10878),

Gene: TagePighther\_15 Start: 9540, Stop: 10043, Start Num: 4

Candidate Starts for TagePighther\_15:

(Start: 4 @9540 has 106 MA's), (23, 9747), (34, 9855), (35, 9882), (36, 9888), (38, 9939), (40, 9966),

Gene: Tefunt\_14 Start: 9435, Stop: 9932, Start Num: 4  
Candidate Starts for Tefunt\_14:  
(Start: 4 @9435 has 106 MA's), (10, 9495), (14, 9534), (25, 9648), (29, 9717), (34, 9750), (38, 9834),

Gene: Thestral\_15 Start: 9504, Stop: 10001, Start Num: 4  
Candidate Starts for Thestral\_15:  
(Start: 4 @9504 has 106 MA's), (10, 9564), (14, 9603), (25, 9717), (29, 9786),

Gene: TinaBelcher\_14 Start: 9452, Stop: 9949, Start Num: 4  
Candidate Starts for TinaBelcher\_14:  
(Start: 4 @9452 has 106 MA's), (10, 9512), (12, 9521), (14, 9551), (25, 9665), (29, 9734), (31, 9752),

Gene: Toma\_14 Start: 9546, Stop: 10049, Start Num: 4  
Candidate Starts for Toma\_14:  
(Start: 4 @9546 has 106 MA's), (23, 9753), (34, 9861), (35, 9888), (36, 9894), (38, 9945), (40, 9972),

Gene: Triste\_14 Start: 9534, Stop: 10037, Start Num: 4  
Candidate Starts for Triste\_14:  
(Start: 4 @9534 has 106 MA's), (23, 9741), (34, 9849), (35, 9876), (36, 9882), (38, 9933), (40, 9960),

Gene: Triumph\_16 Start: 9459, Stop: 9956, Start Num: 4  
Candidate Starts for Triumph\_16:  
(Start: 4 @9459 has 106 MA's), (14, 9558), (17, 9597), (25, 9672), (33, 9771),

Gene: TrvxScott\_13 Start: 9453, Stop: 9950, Start Num: 4  
Candidate Starts for TrvxScott\_13:  
(Start: 4 @9453 has 106 MA's), (10, 9513), (12, 9522), (14, 9552), (25, 9666), (29, 9735),

Gene: TuanPN\_14 Start: 9543, Stop: 10046, Start Num: 4  
Candidate Starts for TuanPN\_14:  
(Start: 4 @9543 has 106 MA's), (32, 9852), (34, 9858), (35, 9885), (36, 9891), (38, 9942), (40, 9969),

Gene: Unstoppable\_14 Start: 9568, Stop: 10071, Start Num: 4  
Candidate Starts for Unstoppable\_14:  
(Start: 4 @9568 has 106 MA's), (6, 9598), (12, 9637), (17, 9706), (27, 9841), (32, 9877), (34, 9883),  
(35, 9910), (36, 9916), (38, 9967), (40, 9994),

Gene: Urza\_14 Start: 9796, Stop: 10299, Start Num: 4  
Candidate Starts for Urza\_14:  
(Start: 4 @9796 has 106 MA's), (10, 9856), (12, 9865), (13, 9889), (14, 9895), (23, 10003), (25, 10009),  
(29, 10078), (34, 10111), (35, 10138), (38, 10195), (40, 10222),

Gene: Vanseggelen\_18 Start: 9273, Stop: 9776, Start Num: 4  
Candidate Starts for Vanseggelen\_18:  
(Start: 4 @9273 has 106 MA's), (7, 9312), (12, 9342), (24, 9483), (40, 9699),

Gene: Verabelle\_15 Start: 9620, Stop: 10123, Start Num: 4  
Candidate Starts for Verabelle\_15:  
(Start: 4 @9620 has 106 MA's), (6, 9650), (7, 9659), (24, 9830), (27, 9893), (40, 10046),

Gene: Verse\_14 Start: 9736, Stop: 10239, Start Num: 4  
Candidate Starts for Verse\_14:  
(Start: 4 @9736 has 106 MA's), (6, 9766), (7, 9775), (24, 9946), (35, 10078), (40, 10162),

Gene: VieEnRose\_14 Start: 9866, Stop: 10369, Start Num: 4

Candidate Starts for VieEnRose\_14:

(Start: 4 @9866 has 106 MA's), (10, 9926), (13, 9959), (14, 9965), (23, 10073), (25, 10079), (29, 10148), (34, 10181), (35, 10208), (38, 10265), (40, 10292),

Gene: Werner\_14 Start: 9541, Stop: 10044, Start Num: 4

Candidate Starts for Werner\_14:

(3, 9460), (Start: 4 @9541 has 106 MA's), (23, 9748), (34, 9856), (35, 9883), (36, 9889), (38, 9940), (40, 9967),

Gene: Whatever\_14 Start: 9541, Stop: 10044, Start Num: 4

Candidate Starts for Whatever\_14:

(Start: 4 @9541 has 106 MA's), (23, 9748), (34, 9856), (35, 9883), (36, 9889), (38, 9940), (40, 9967),

Gene: Yasdnil\_14 Start: 9539, Stop: 10042, Start Num: 4

Candidate Starts for Yasdnil\_14:

(Start: 4 @9539 has 106 MA's), (32, 9848), (34, 9854), (35, 9881), (36, 9887), (38, 9938), (40, 9965),

Gene: Yosif\_15 Start: 10000, Stop: 10503, Start Num: 4

Candidate Starts for Yosif\_15:

(Start: 4 @10000 has 106 MA's), (6, 10030), (14, 10099), (21, 10168), (34, 10315), (35, 10342), (40, 10426), (42, 10444),

Gene: Zainub\_16 Start: 10005, Stop: 10502, Start Num: 4

Candidate Starts for Zainub\_16:

(Start: 4 @10005 has 106 MA's), (10, 10065), (14, 10104), (29, 10287),

Gene: Zemlya\_15 Start: 9554, Stop: 10057, Start Num: 4

Candidate Starts for Zemlya\_15:

(Start: 4 @9554 has 106 MA's), (23, 9761), (34, 9869), (35, 9896), (36, 9902), (38, 9953), (40, 9980),

Gene: phiCAM\_15 Start: 11402, Stop: 11905, Start Num: 4

Candidate Starts for phiCAM\_15:

(Start: 4 @11402 has 106 MA's), (7, 11441), (12, 11471), (24, 11612), (43, 11894),

Gene: phiHau3\_16 Start: 9695, Stop: 10198, Start Num: 4

Candidate Starts for phiHau3\_16:

(Start: 4 @9695 has 106 MA's), (23, 9902), (25, 9908), (27, 9968), (36, 10043), (40, 10121),