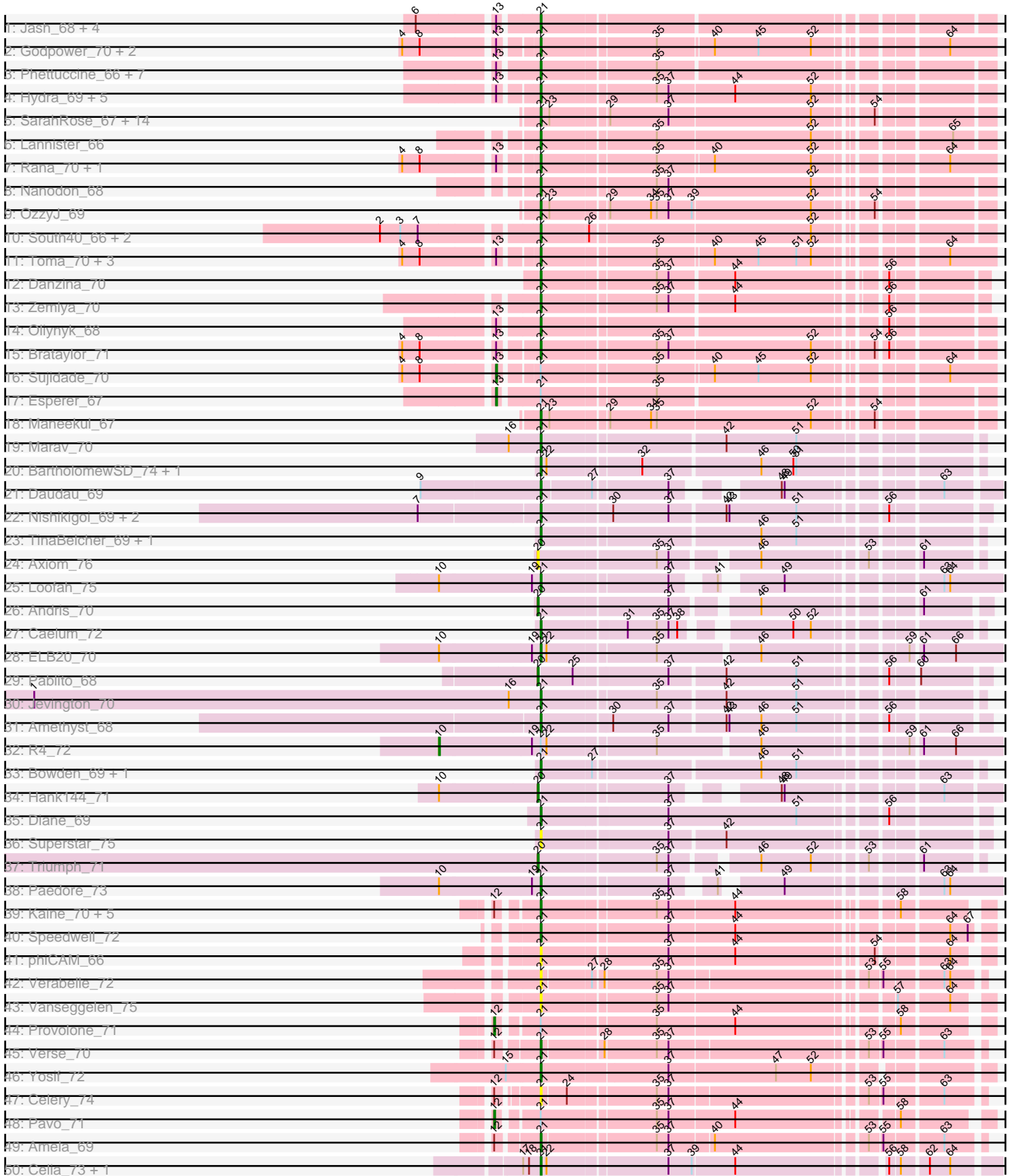
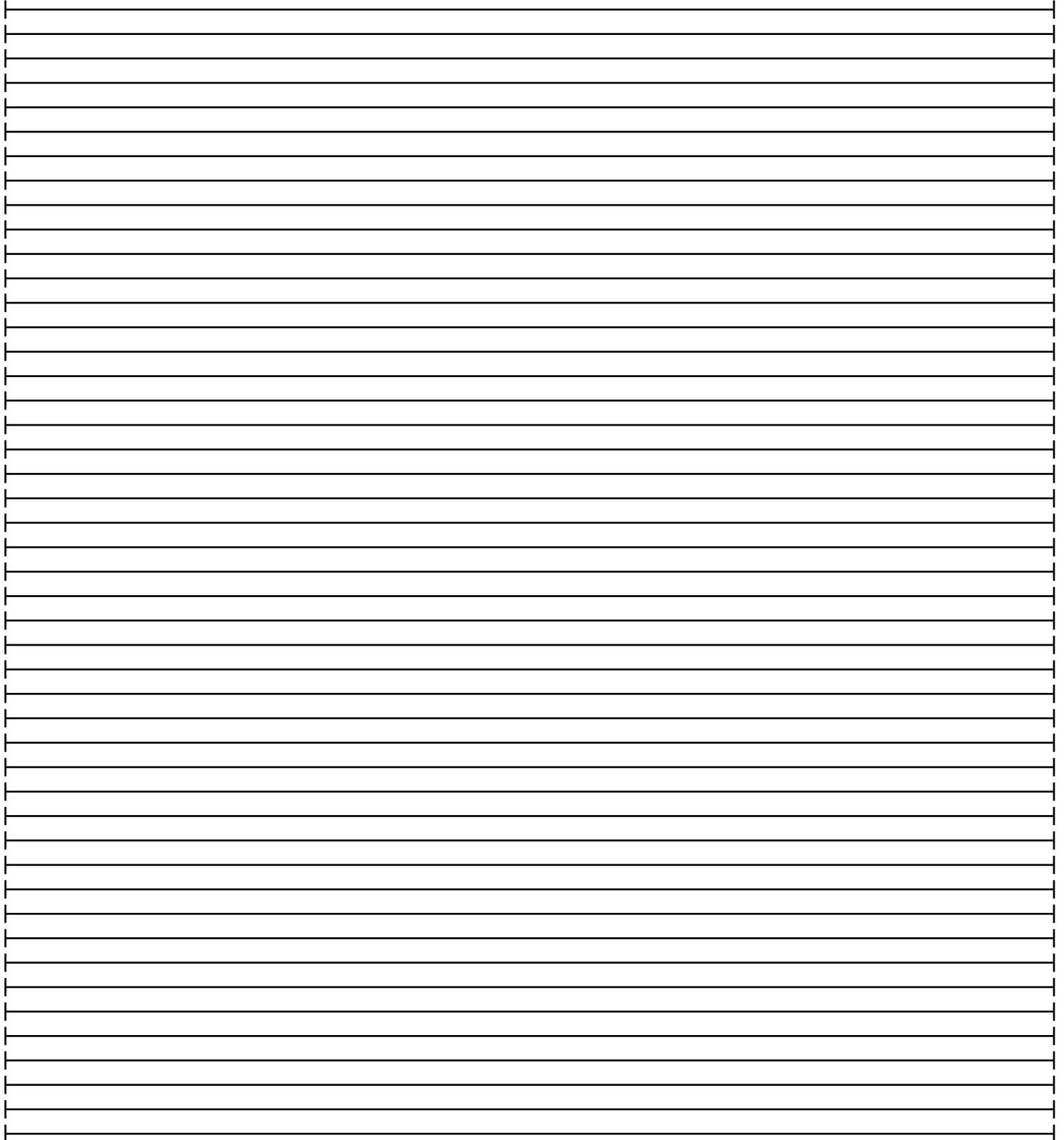
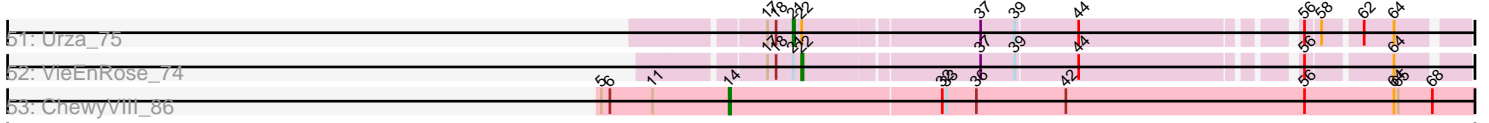


Pham 214155



Pham 214155



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 214155 Report

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

Pham number 214155 has 102 members, 7 are drafts.

Phages represented in each track:

- Track 1 : Jash\_68, BryanRecycles\_68, Izzy\_68, Eddasa\_69, Rusticus\_68
- Track 2 : Godpower\_70, Nabi\_70, Lika\_69
- Track 3 : Phettuccine\_66, Aaronocolus\_66, Indigo\_65, Bovely\_66, Nerdos\_65, EnochSoames\_70, Leviticus\_67, Unstoppable\_66
- Track 4 : Hydra\_69, Ozzie\_66, Caliburn\_66, Legacy\_66, BeardedLady\_67, SunsetPointe\_66
- Track 5 : SarahRose\_67, BarryBee\_70, TagePhighter\_69, Whatever\_67, Triste\_68, Emaanora\_70, Asten\_67, TuanPN\_65, Yasdnil\_67, Snorlax\_67, Hippo\_67, Werner\_67, Ejemplo\_65, Dwayne\_67, Chucky\_67
- Track 6 : Lannister\_66
- Track 7 : Rana\_70, Lorelei\_69
- Track 8 : Nanodon\_68
- Track 9 : OzzyJ\_69
- Track 10 : South40\_66, Katalie\_66, RedBear\_67
- Track 11 : Toma\_70, Celeste\_70, Goby\_70, Dattran\_71
- Track 12 : Danzina\_70
- Track 13 : Zemlya\_70
- Track 14 : Oliynyk\_68
- Track 15 : Brataylor\_71
- Track 16 : Sujidade\_70
- Track 17 : Esperer\_67
- Track 18 : Maneekul\_67
- Track 19 : Marav\_70
- Track 20 : BartholomewSD\_74, Alvy\_74
- Track 21 : Daudau\_69
- Track 22 : Nishikigoi\_69, Tefunt\_68, Haizum\_68
- Track 23 : TinaBelcher\_69, Thestral\_71
- Track 24 : Axiom\_76
- Track 25 : Loofah\_75
- Track 26 : Andris\_70
- Track 27 : Caelum\_72
- Track 28 : ELB20\_70
- Track 29 : Pablito\_68
- Track 30 : Jevington\_70
- Track 31 : Amethyst\_68
- Track 32 : R4\_72
- Track 33 : Bowden\_69, TrvxScott\_68

- Track 34 : Hank144\_71
- Track 35 : Diane\_69
- Track 36 : Superstar\_75
- Track 37 : Triumph\_71
- Track 38 : Paedore\_73
- Track 39 : Kaine\_70, ElGato\_71, Saftant\_68, Dexers\_68, Conan\_71, Alsaber\_70
- Track 40 : Speedwell\_72
- Track 41 : phiCAM\_66
- Track 42 : Verabelle\_72
- Track 43 : Vanseggelen\_75
- Track 44 : Provolone\_71
- Track 45 : Verse\_70
- Track 46 : Yosif\_72
- Track 47 : Celery\_74
- Track 48 : Pavo\_71
- Track 49 : Amela\_69
- Track 50 : Celia\_73, Itza\_76
- Track 51 : Urza\_75
- Track 52 : VieEnRose\_74
- Track 53 : ChewyVIII\_86

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

The start number called the most often in the published annotations is 21, it was called in 84 of the 95 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_66, Alsaber\_70, Alvy\_74, Amela\_69, Amethyst\_68, Asten\_67, BarryBee\_70, BartholomewSD\_74, BeardedLady\_67, Bovely\_66, Bowden\_69, Brataylor\_71, BryanRecycles\_68, Caelum\_72, Caliburn\_66, Celery\_74, Celeste\_70, Celia\_73, Chucky\_67, Conan\_71, Danzina\_70, Dattran\_71, Daudau\_69, Dexers\_68, Diane\_69, Dwayne\_67, ELB20\_70, Eddasa\_69, Ejemplo\_65, ElGato\_71, Emaanora\_70, EnochSoames\_70, Goby\_70, Godpower\_70, Haizum\_68, Hippo\_67, Hydra\_69, Indigo\_65, Itza\_76, Izzy\_68, Jash\_68, Jevington\_70, Kaine\_70, Katalie\_66, Lannister\_66, Legacy\_66, Leviticus\_67, Lika\_69, Loofah\_75, Lorelei\_69, Maneekul\_67, Marav\_70, Nabi\_70, Nanodon\_68, Nerdos\_65, Nishikigoi\_69, Oliynyk\_68, Ozzie\_66, OzzyJ\_69, Paedore\_73, Phettuccine\_66, Rana\_70, RedBear\_67, Rusticus\_68, Saftant\_68, SarahRose\_67, Snorlax\_67, South40\_66, Speedwell\_72, SunsetPointe\_66, Superstar\_75, TagePhighter\_69, Tefunt\_68, Thestral\_71, TinaBelcher\_69, Toma\_70, Triste\_68, TrvxScott\_68, TuanPN\_65, Unstoppable\_66, Urza\_75, Vanseggelen\_75, Verabelle\_72, Verse\_70, Werner\_67, Whatever\_67, Yasdnil\_67, Yosif\_72, Zemlya\_70, phiCAM\_66,

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

- Esperer\_67, Pavo\_71, Provolone\_71, R4\_72, Sujidade\_70, VieEnRose\_74,

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

- Andris\_70, Axiom\_76, ChewyVIII\_86, Hank144\_71, Pablito\_68, Triumph\_71,

**Summary by start number:**

Start 10:

- Found in 5 of 102 ( 4.9% ) of genes in pham
- Manual Annotations of this start: 1 of 95
- Called 20.0% of time when present
- Phage (with cluster) where this start called: R4\_72 (BD2),

Start 12:

- Found in 11 of 102 ( 10.8% ) of genes in pham
- Manual Annotations of this start: 2 of 95
- Called 18.2% of time when present
- Phage (with cluster) where this start called: Pavo\_71 (BD3), Provolone\_71 (BD3),

Start 13:

- Found in 32 of 102 ( 31.4% ) of genes in pham
- Manual Annotations of this start: 2 of 95
- Called 6.2% of time when present
- Phage (with cluster) where this start called: Esperer\_67 (BD1), Sujidade\_70 (BD1),

Start 14:

- Found in 1 of 102 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 95
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ChewyVIII\_86 (singleton),

Start 20:

- Found in 5 of 102 ( 4.9% ) of genes in pham
- Manual Annotations of this start: 4 of 95
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Andris\_70 (BD2), Axiom\_76 (BD2), Hank144\_71 (BD2), Pablito\_68 (BD2), Triumph\_71 (BD2),

Start 21:

- Found in 96 of 102 ( 94.1% ) of genes in pham
- Manual Annotations of this start: 84 of 95
- Called 93.8% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_66 (BD1), Alsaber\_70 (BD3), Alvy\_74 (BD2), Amela\_69 (BD3), Amethyst\_68 (BD2), Asten\_67 (BD1), BarryBee\_70 (BD1), BartholomewSD\_74 (BD2), BeardedLady\_67 (BD1), Bovely\_66 (BD1), Bowden\_69 (BD2), Brataylor\_71 (BD1), BryanRecycles\_68 (BD1), Caelum\_72 (BD2), Caliburn\_66 (BD1), Celery\_74 (BD3), Celeste\_70 (BD1), Celia\_73 (BD6), Chucky\_67 (BD1), Conan\_71 (BD3), Danzina\_70 (BD1), Dattran\_71 (BD1), Daudau\_69 (BD2), Dexers\_68 (BD3), Diane\_69 (BD2), Dwayne\_67 (BD1), ELB20\_70 (BD2), Eddasa\_69 (BD1), Ejemplo\_65 (BD1), ElGato\_71 (BD3), Emaanora\_70 (BD1), EnochSoames\_70 (BD1), Goby\_70 (BD1), Godpower\_70 (BD1), Haizum\_68 (BD2), Hippo\_67 (BD1), Hydra\_69 (BD1), Indigo\_65 (BD1), Itza\_76 (BD6), Izzy\_68 (BD1), Jash\_68 (BD1), Jevington\_70 (BD2), Kaine\_70 (BD3), Katalie\_66 (BD1), Lannister\_66 (BD1), Legacy\_66 (BD1), Leviticus\_67 (BD1), Lika\_69 (BD1), Loofah\_75 (BD2), Lorelei\_69 (BD1), Maneekul\_67 (BD1), Marav\_70 (BD2), Nabi\_70 (BD1), Nanodon\_68 (BD1), Nerdos\_65 (BD1), Nishikigoi\_69 (BD2), Oliynyk\_68 (BD1), Ozzie\_66 (BD1), OzzyJ\_69 (BD1), Paedore\_73 (BD2), Phettuccine\_66 (BD1), Rana\_70 (BD1), RedBear\_67 (BD1), Rusticus\_68 (BD1), Saftant\_68 (BD3), SarahRose\_67 (BD1), Snorlax\_67 (BD1), South40\_66 (BD1), Speedwell\_72 (BD3),

SunsetPointe\_66 (BD1), Superstar\_75 (BD2), TagePhighter\_69 (BD1), Tefunt\_68 (BD2), Thestral\_71 (BD2), TinaBelcher\_69 (BD2), Toma\_70 (BD1), Triste\_68 (BD1), TrvxScott\_68 (BD2), TuanPN\_65 (BD1), Unstoppable\_66 (BD1), Urza\_75 (BD6), Vanseggelen\_75 (BD3), Verabelle\_72 (BD3), Verse\_70 (BD3), Werner\_67 (BD1), Whatever\_67 (BD1), Yasdnil\_67 (BD1), Yosif\_72 (BD3), Zemlya\_70 (BD1), phiCAM\_66 (BD3),

Start 22:

- Found in 8 of 102 ( 7.8% ) of genes in pham
- Manual Annotations of this start: 1 of 95
- Called 12.5% of time when present
- Phage (with cluster) where this start called: VieEnRose\_74 (BD6),

### **Summary by clusters:**

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

Info for manual annotations of cluster BD1:

- Start number 13 was manually annotated 2 times for cluster BD1.
- Start number 21 was manually annotated 53 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 10 was manually annotated 1 time for cluster BD2.
- Start number 20 was manually annotated 4 times for cluster BD2.
- Start number 21 was manually annotated 18 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 12 was manually annotated 2 times for cluster BD3.
- Start number 21 was manually annotated 10 times for cluster BD3.

Info for manual annotations of cluster BD6:

- Start number 21 was manually annotated 3 times for cluster BD6.
- Start number 22 was manually annotated 1 time for cluster BD6.

### **Gene Information:**

Gene: Aaronocolus\_66 Start: 45400, Stop: 44981, Start Num: 21

Candidate Starts for Aaronocolus\_66:

(Start: 13 @45436 has 2 MA's), (Start: 21 @45400 has 84 MA's), (35, 45289),

Gene: Alsaber\_70 Start: 45538, Stop: 45128, Start Num: 21

Candidate Starts for Alsaber\_70:

(Start: 12 @45571 has 2 MA's), (Start: 21 @45538 has 84 MA's), (35, 45427), (37, 45415), (44, 45349), (58, 45205),

Gene: Alvy\_74 Start: 47158, Stop: 46745, Start Num: 21

Candidate Starts for Alvy\_74:

(Start: 21 @47158 has 84 MA's), (Start: 22 @47152 has 1 MA's), (32, 47062), (46, 46945), (50, 46912), (51, 46909),

Gene: Amela\_69 Start: 46182, Stop: 45775, Start Num: 21

Candidate Starts for Amela\_69:

(Start: 12 @46218 has 2 MA's), (Start: 21 @46182 has 84 MA's), (35, 46074), (37, 46062), (40, 46020), (53, 45876), (55, 45864), (63, 45810),

Gene: Amethyst\_68 Start: 44179, Stop: 43766, Start Num: 21

Candidate Starts for Amethyst\_68:

(Start: 21 @44179 has 84 MA's), (30, 44113), (37, 44056), (42, 44002), (43, 43999), (46, 43966), (51, 43930), (56, 43855),

Gene: Andris\_70 Start: 45059, Stop: 44655, Start Num: 20

Candidate Starts for Andris\_70:

(Start: 20 @45059 has 4 MA's), (37, 44930), (46, 44855), (61, 44717),

Gene: Asten\_67 Start: 47722, Stop: 47303, Start Num: 21

Candidate Starts for Asten\_67:

(Start: 21 @47722 has 84 MA's), (23, 47713), (29, 47659), (37, 47599), (52, 47455), (54, 47407),

Gene: Axiom\_76 Start: 45808, Stop: 45410, Start Num: 20

Candidate Starts for Axiom\_76:

(Start: 20 @45808 has 4 MA's), (35, 45691), (37, 45679), (46, 45604), (53, 45508), (61, 45466),

Gene: BarryBee\_70 Start: 47696, Stop: 47277, Start Num: 21

Candidate Starts for BarryBee\_70:

(Start: 21 @47696 has 84 MA's), (23, 47687), (29, 47633), (37, 47573), (52, 47429), (54, 47381),

Gene: BartholomewSD\_74 Start: 46277, Stop: 45864, Start Num: 21

Candidate Starts for BartholomewSD\_74:

(Start: 21 @46277 has 84 MA's), (Start: 22 @46271 has 1 MA's), (32, 46181), (46, 46064), (50, 46031), (51, 46028),

Gene: BeardedLady\_67 Start: 45783, Stop: 45364, Start Num: 21

Candidate Starts for BeardedLady\_67:

(Start: 13 @45816 has 2 MA's), (Start: 21 @45783 has 84 MA's), (35, 45672), (37, 45660), (44, 45594), (52, 45516),

Gene: Bovely\_66 Start: 45403, Stop: 44984, Start Num: 21

Candidate Starts for Bovely\_66:

(Start: 13 @45439 has 2 MA's), (Start: 21 @45403 has 84 MA's), (35, 45292),

Gene: Bowden\_69 Start: 46847, Stop: 46434, Start Num: 21

Candidate Starts for Bowden\_69:

(Start: 21 @46847 has 84 MA's), (27, 46796), (46, 46634), (51, 46598),

Gene: Brataylor\_71 Start: 47249, Stop: 46830, Start Num: 21

Candidate Starts for Brataylor\_71:

(4, 47369), (8, 47351), (Start: 13 @47282 has 2 MA's), (Start: 21 @47249 has 84 MA's), (35, 47138), (37, 47126), (52, 46982), (54, 46934), (56, 46925),

Gene: BryanRecycles\_68 Start: 45898, Stop: 45479, Start Num: 21

Candidate Starts for BryanRecycles\_68:

(6, 46006), (Start: 13 @45934 has 2 MA's), (Start: 21 @45898 has 84 MA's),

Gene: Caelum\_72 Start: 45115, Stop: 44732, Start Num: 21

Candidate Starts for Caelum\_72:

(Start: 21 @45115 has 84 MA's), (31, 45034), (35, 45004), (37, 44992), (38, 44983), (50, 44893), (52, 44875),

Gene: Caliburn\_66 Start: 45791, Stop: 45372, Start Num: 21

Candidate Starts for Caliburn\_66:

(Start: 13 @45824 has 2 MA's), (Start: 21 @45791 has 84 MA's), (35, 45680), (37, 45668), (44, 45602), (52, 45524),

Gene: Celery\_74 Start: 45236, Stop: 44829, Start Num: 21

Candidate Starts for Celery\_74:

(Start: 12 @45269 has 2 MA's), (Start: 21 @45236 has 84 MA's), (24, 45212), (35, 45128), (37, 45116), (53, 44930), (55, 44918), (63, 44864),

Gene: Celeste\_70 Start: 46717, Stop: 46295, Start Num: 21

Candidate Starts for Celeste\_70:

(4, 46837), (8, 46819), (Start: 13 @46750 has 2 MA's), (Start: 21 @46717 has 84 MA's), (35, 46606), (40, 46552), (45, 46507), (51, 46468), (52, 46453), (64, 46342),

Gene: Celia\_73 Start: 47774, Stop: 47352, Start Num: 21

Candidate Starts for Celia\_73:

(17, 47792), (18, 47786), (Start: 21 @47774 has 84 MA's), (Start: 22 @47768 has 1 MA's), (37, 47651), (39, 47627), (44, 47585), (56, 47450), (58, 47441), (62, 47417), (64, 47396),

Gene: ChewyVIII\_86 Start: 63930, Stop: 64469, Start Num: 14

Candidate Starts for ChewyVIII\_86:

(5, 63840), (6, 63846), (11, 63876), (Start: 14 @63930 has 1 MA's), (32, 64077), (33, 64080), (36, 64101), (42, 64164), (56, 64332), (64, 64395), (65, 64398), (68, 64422),

Gene: Chucky\_67 Start: 47757, Stop: 47338, Start Num: 21

Candidate Starts for Chucky\_67:

(Start: 21 @47757 has 84 MA's), (23, 47748), (29, 47694), (37, 47634), (52, 47490), (54, 47442),

Gene: Conan\_71 Start: 45790, Stop: 45380, Start Num: 21

Candidate Starts for Conan\_71:

(Start: 12 @45823 has 2 MA's), (Start: 21 @45790 has 84 MA's), (35, 45679), (37, 45667), (44, 45601), (58, 45457),

Gene: Danzina\_70 Start: 46953, Stop: 46543, Start Num: 21

Candidate Starts for Danzina\_70:

(Start: 21 @46953 has 84 MA's), (35, 46842), (37, 46830), (44, 46767), (56, 46632),

Gene: Dattran\_71 Start: 47170, Stop: 46748, Start Num: 21

Candidate Starts for Dattran\_71:

(4, 47290), (8, 47272), (Start: 13 @47203 has 2 MA's), (Start: 21 @47170 has 84 MA's), (35, 47059), (40, 47005), (45, 46960), (51, 46921), (52, 46906), (64, 46795),

Gene: Daudau\_69 Start: 44691, Stop: 44308, Start Num: 21

Candidate Starts for Daudau\_69:

(9, 44811), (Start: 21 @44691 has 84 MA's), (27, 44643), (37, 44571), (48, 44496), (49, 44493), (63, 44358),

Gene: Dexers\_68 Start: 45764, Stop: 45354, Start Num: 21



Candidate Starts for Dexers\_68:

(Start: 12 @45797 has 2 MA's), (Start: 21 @45764 has 84 MA's), (35, 45653), (37, 45641), (44, 45575), (58, 45431),

Gene: Diane\_69 Start: 45270, Stop: 44851, Start Num: 21

Candidate Starts for Diane\_69:

(Start: 21 @45270 has 84 MA's), (37, 45147), (51, 45015), (56, 44940),

Gene: Dwayne\_67 Start: 47745, Stop: 47326, Start Num: 21

Candidate Starts for Dwayne\_67:

(Start: 21 @47745 has 84 MA's), (23, 47736), (29, 47682), (37, 47622), (52, 47478), (54, 47430),

Gene: ELB20\_70 Start: 45570, Stop: 45142, Start Num: 21

Candidate Starts for ELB20\_70:

(Start: 10 @45672 has 1 MA's), (19, 45579), (Start: 21 @45570 has 84 MA's), (Start: 22 @45564 has 1 MA's), (35, 45459), (46, 45360), (59, 45231), (61, 45222), (66, 45189),

Gene: Eddasa\_69 Start: 46437, Stop: 46018, Start Num: 21

Candidate Starts for Eddasa\_69:

(6, 46545), (Start: 13 @46473 has 2 MA's), (Start: 21 @46437 has 84 MA's),

Gene: Ejemplo\_65 Start: 47683, Stop: 47264, Start Num: 21

Candidate Starts for Ejemplo\_65:

(Start: 21 @47683 has 84 MA's), (23, 47674), (29, 47620), (37, 47560), (52, 47416), (54, 47368),

Gene: ElGato\_71 Start: 45667, Stop: 45257, Start Num: 21

Candidate Starts for ElGato\_71:

(Start: 12 @45700 has 2 MA's), (Start: 21 @45667 has 84 MA's), (35, 45556), (37, 45544), (44, 45478), (58, 45334),

Gene: Emaanora\_70 Start: 47669, Stop: 47250, Start Num: 21

Candidate Starts for Emaanora\_70:

(Start: 21 @47669 has 84 MA's), (23, 47660), (29, 47606), (37, 47546), (52, 47402), (54, 47354),

Gene: EnochSoames\_70 Start: 45695, Stop: 45276, Start Num: 21

Candidate Starts for EnochSoames\_70:

(Start: 13 @45731 has 2 MA's), (Start: 21 @45695 has 84 MA's), (35, 45584),

Gene: Esperer\_67 Start: 45782, Stop: 45327, Start Num: 13

Candidate Starts for Esperer\_67:

(Start: 13 @45782 has 2 MA's), (Start: 21 @45746 has 84 MA's), (35, 45635),

Gene: Goby\_70 Start: 47587, Stop: 47165, Start Num: 21

Candidate Starts for Goby\_70:

(4, 47707), (8, 47689), (Start: 13 @47620 has 2 MA's), (Start: 21 @47587 has 84 MA's), (35, 47476), (40, 47422), (45, 47377), (51, 47338), (52, 47323), (64, 47212),

Gene: Godpower\_70 Start: 46879, Stop: 46457, Start Num: 21

Candidate Starts for Godpower\_70:

(4, 46999), (8, 46981), (Start: 13 @46912 has 2 MA's), (Start: 21 @46879 has 84 MA's), (35, 46768), (40, 46714), (45, 46669), (52, 46615), (64, 46504),

Gene: Haizum\_68 Start: 44987, Stop: 44574, Start Num: 21

Candidate Starts for Haizum\_68:

(7, 45107), (Start: 21 @44987 has 84 MA's), (30, 44921), (37, 44864), (42, 44810), (43, 44807), (51, 44738), (56, 44663),

Gene: Hank144\_71 Start: 45801, Stop: 45412, Start Num: 20

Candidate Starts for Hank144\_71:

(Start: 10 @45900 has 1 MA's), (Start: 20 @45801 has 4 MA's), (37, 45678), (48, 45603), (49, 45600), (63, 45465),

Gene: Hippo\_67 Start: 47732, Stop: 47313, Start Num: 21

Candidate Starts for Hippo\_67:

(Start: 21 @47732 has 84 MA's), (23, 47723), (29, 47669), (37, 47609), (52, 47465), (54, 47417),

Gene: Hydra\_69 Start: 46593, Stop: 46174, Start Num: 21

Candidate Starts for Hydra\_69:

(Start: 13 @46626 has 2 MA's), (Start: 21 @46593 has 84 MA's), (35, 46482), (37, 46470), (44, 46404), (52, 46326),

Gene: Indigo\_65 Start: 45396, Stop: 44977, Start Num: 21

Candidate Starts for Indigo\_65:

(Start: 13 @45432 has 2 MA's), (Start: 21 @45396 has 84 MA's), (35, 45285),

Gene: Itza\_76 Start: 47707, Stop: 47285, Start Num: 21

Candidate Starts for Itza\_76:

(17, 47725), (18, 47719), (Start: 21 @47707 has 84 MA's), (Start: 22 @47701 has 1 MA's), (37, 47584), (39, 47560), (44, 47518), (56, 47383), (58, 47374), (62, 47350), (64, 47329),

Gene: Izzy\_68 Start: 45945, Stop: 45526, Start Num: 21

Candidate Starts for Izzy\_68:

(6, 46053), (Start: 13 @45981 has 2 MA's), (Start: 21 @45945 has 84 MA's),

Gene: Jash\_68 Start: 45898, Stop: 45479, Start Num: 21

Candidate Starts for Jash\_68:

(6, 46006), (Start: 13 @45934 has 2 MA's), (Start: 21 @45898 has 84 MA's),

Gene: Jevington\_70 Start: 44156, Stop: 43743, Start Num: 21

Candidate Starts for Jevington\_70:

(1, 44675), (16, 44186), (Start: 21 @44156 has 84 MA's), (35, 44045), (42, 43979), (51, 43907),

Gene: Kaine\_70 Start: 45562, Stop: 45152, Start Num: 21

Candidate Starts for Kaine\_70:

(Start: 12 @45595 has 2 MA's), (Start: 21 @45562 has 84 MA's), (35, 45451), (37, 45439), (44, 45373), (58, 45229),

Gene: Katalie\_66 Start: 47468, Stop: 47049, Start Num: 21

Candidate Starts for Katalie\_66:

(2, 47612), (3, 47591), (7, 47573), (Start: 21 @47468 has 84 MA's), (26, 47420), (52, 47201),

Gene: Lannister\_66 Start: 46222, Stop: 45803, Start Num: 21

Candidate Starts for Lannister\_66:

(Start: 21 @46222 has 84 MA's), (35, 46111), (52, 45955), (65, 45841),

Gene: Legacy\_66 Start: 45782, Stop: 45363, Start Num: 21

Candidate Starts for Legacy\_66:

(Start: 13 @45815 has 2 MA's), (Start: 21 @45782 has 84 MA's), (35, 45671), (37, 45659), (44, 45593), (52, 45515),

Gene: Leviticus\_67 Start: 45933, Stop: 45514, Start Num: 21

Candidate Starts for Leviticus\_67:

(Start: 13 @45969 has 2 MA's), (Start: 21 @45933 has 84 MA's), (35, 45822),

Gene: Lika\_69 Start: 47432, Stop: 47010, Start Num: 21

Candidate Starts for Lika\_69:

(4, 47552), (8, 47534), (Start: 13 @47465 has 2 MA's), (Start: 21 @47432 has 84 MA's), (35, 47321), (40, 47267), (45, 47222), (52, 47168), (64, 47057),

Gene: Loofah\_75 Start: 46518, Stop: 46123, Start Num: 21

Candidate Starts for Loofah\_75:

(Start: 10 @46620 has 1 MA's), (19, 46527), (Start: 21 @46518 has 84 MA's), (37, 46395), (41, 46365), (49, 46317), (63, 46182), (64, 46176),

Gene: Lorelei\_69 Start: 46723, Stop: 46301, Start Num: 21

Candidate Starts for Lorelei\_69:

(4, 46843), (8, 46825), (Start: 13 @46756 has 2 MA's), (Start: 21 @46723 has 84 MA's), (35, 46612), (40, 46558), (52, 46459), (64, 46348),

Gene: Maneekul\_67 Start: 47762, Stop: 47343, Start Num: 21

Candidate Starts for Maneekul\_67:

(Start: 21 @47762 has 84 MA's), (23, 47753), (29, 47699), (34, 47657), (35, 47651), (52, 47495), (54, 47447),

Gene: Marav\_70 Start: 44143, Stop: 43730, Start Num: 21

Candidate Starts for Marav\_70:

(16, 44173), (Start: 21 @44143 has 84 MA's), (42, 43966), (51, 43894),

Gene: Nabi\_70 Start: 47292, Stop: 46870, Start Num: 21

Candidate Starts for Nabi\_70:

(4, 47412), (8, 47394), (Start: 13 @47325 has 2 MA's), (Start: 21 @47292 has 84 MA's), (35, 47181), (40, 47127), (45, 47082), (52, 47028), (64, 46917),

Gene: Nanodon\_68 Start: 46151, Stop: 45732, Start Num: 21

Candidate Starts for Nanodon\_68:

(Start: 21 @46151 has 84 MA's), (35, 46040), (37, 46028), (52, 45884),

Gene: Nerdos\_65 Start: 45395, Stop: 44976, Start Num: 21

Candidate Starts for Nerdos\_65:

(Start: 13 @45431 has 2 MA's), (Start: 21 @45395 has 84 MA's), (35, 45284),

Gene: Nishikigoi\_69 Start: 44987, Stop: 44574, Start Num: 21

Candidate Starts for Nishikigoi\_69:

(7, 45107), (Start: 21 @44987 has 84 MA's), (30, 44921), (37, 44864), (42, 44810), (43, 44807), (51, 44738), (56, 44663),

Gene: Oliynyk\_68 Start: 45898, Stop: 45479, Start Num: 21

Candidate Starts for Oliynyk\_68:

(Start: 13 @45934 has 2 MA's), (Start: 21 @45898 has 84 MA's), (56, 45574),

Gene: Ozzie\_66 Start: 45791, Stop: 45372, Start Num: 21

Candidate Starts for Ozzie\_66:

(Start: 13 @45824 has 2 MA's), (Start: 21 @45791 has 84 MA's), (35, 45680), (37, 45668), (44, 45602), (52, 45524),

Gene: OzzyJ\_69 Start: 47665, Stop: 47246, Start Num: 21

Candidate Starts for OzzyJ\_69:

(Start: 21 @47665 has 84 MA's), (23, 47656), (29, 47602), (34, 47560), (35, 47554), (37, 47542), (39, 47518), (52, 47398), (54, 47350),

Gene: Pablito\_68 Start: 44389, Stop: 43976, Start Num: 20

Candidate Starts for Pablito\_68:

(Start: 20 @44389 has 4 MA's), (25, 44356), (37, 44266), (42, 44212), (51, 44140), (56, 44065), (60, 44041),

Gene: Paedore\_73 Start: 46884, Stop: 46489, Start Num: 21

Candidate Starts for Paedore\_73:

(Start: 10 @46986 has 1 MA's), (19, 46893), (Start: 21 @46884 has 84 MA's), (37, 46761), (41, 46731), (49, 46683), (63, 46548), (64, 46542),

Gene: Pavo\_71 Start: 45771, Stop: 45328, Start Num: 12

Candidate Starts for Pavo\_71:

(Start: 12 @45771 has 2 MA's), (Start: 21 @45738 has 84 MA's), (35, 45627), (37, 45615), (44, 45549), (58, 45405),

Gene: Phettuccine\_66 Start: 45396, Stop: 44977, Start Num: 21

Candidate Starts for Phettuccine\_66:

(Start: 13 @45432 has 2 MA's), (Start: 21 @45396 has 84 MA's), (35, 45285),

Gene: Provolone\_71 Start: 45912, Stop: 45469, Start Num: 12

Candidate Starts for Provolone\_71:

(Start: 12 @45912 has 2 MA's), (Start: 21 @45879 has 84 MA's), (35, 45768), (44, 45690), (58, 45546),

Gene: R4\_72 Start: 45832, Stop: 45302, Start Num: 10

Candidate Starts for R4\_72:

(Start: 10 @45832 has 1 MA's), (19, 45739), (Start: 21 @45730 has 84 MA's), (Start: 22 @45724 has 1 MA's), (35, 45619), (46, 45520), (59, 45391), (61, 45382), (66, 45349),

Gene: Rana\_70 Start: 47145, Stop: 46723, Start Num: 21

Candidate Starts for Rana\_70:

(4, 47265), (8, 47247), (Start: 13 @47178 has 2 MA's), (Start: 21 @47145 has 84 MA's), (35, 47034), (40, 46980), (52, 46881), (64, 46770),

Gene: RedBear\_67 Start: 47468, Stop: 47049, Start Num: 21

Candidate Starts for RedBear\_67:

(2, 47612), (3, 47591), (7, 47573), (Start: 21 @47468 has 84 MA's), (26, 47420), (52, 47201),

Gene: Rusticus\_68 Start: 45898, Stop: 45479, Start Num: 21

Candidate Starts for Rusticus\_68:

(6, 46006), (Start: 13 @45934 has 2 MA's), (Start: 21 @45898 has 84 MA's),

Gene: Saftant\_68 Start: 45610, Stop: 45200, Start Num: 21

Candidate Starts for Saftant\_68:

(Start: 12 @45643 has 2 MA's), (Start: 21 @45610 has 84 MA's), (35, 45499), (37, 45487), (44, 45421), (58, 45277),

Gene: SarahRose\_67 Start: 47732, Stop: 47313, Start Num: 21

Candidate Starts for SarahRose\_67:

(Start: 21 @47732 has 84 MA's), (23, 47723), (29, 47669), (37, 47609), (52, 47465), (54, 47417),

Gene: Snorlax\_67 Start: 47757, Stop: 47338, Start Num: 21

Candidate Starts for Snorlax\_67:

(Start: 21 @47757 has 84 MA's), (23, 47748), (29, 47694), (37, 47634), (52, 47490), (54, 47442),

Gene: South40\_66 Start: 47468, Stop: 47049, Start Num: 21

Candidate Starts for South40\_66:

(2, 47612), (3, 47591), (7, 47573), (Start: 21 @47468 has 84 MA's), (26, 47420), (52, 47201),

Gene: Speedwell\_72 Start: 46319, Stop: 45903, Start Num: 21

Candidate Starts for Speedwell\_72:

(Start: 21 @46319 has 84 MA's), (37, 46196), (44, 46130), (64, 45941), (67, 45923),

Gene: Sujidade\_70 Start: 47762, Stop: 47307, Start Num: 13

Candidate Starts for Sujidade\_70:

(4, 47849), (8, 47831), (Start: 13 @47762 has 2 MA's), (Start: 21 @47729 has 84 MA's), (35, 47618), (40, 47564), (45, 47519), (52, 47465), (64, 47354),

Gene: SunsetPointe\_66 Start: 45798, Stop: 45379, Start Num: 21

Candidate Starts for SunsetPointe\_66:

(Start: 13 @45831 has 2 MA's), (Start: 21 @45798 has 84 MA's), (35, 45687), (37, 45675), (44, 45609), (52, 45531),

Gene: Superstar\_75 Start: 45152, Stop: 44739, Start Num: 21

Candidate Starts for Superstar\_75:

(Start: 21 @45152 has 84 MA's), (37, 45029), (42, 44975),

Gene: TagePighter\_69 Start: 47732, Stop: 47313, Start Num: 21

Candidate Starts for TagePighter\_69:

(Start: 21 @47732 has 84 MA's), (23, 47723), (29, 47669), (37, 47609), (52, 47465), (54, 47417),

Gene: Tefunt\_68 Start: 44901, Stop: 44488, Start Num: 21

Candidate Starts for Tefunt\_68:

(7, 45021), (Start: 21 @44901 has 84 MA's), (30, 44835), (37, 44778), (42, 44724), (43, 44721), (51, 44652), (56, 44577),

Gene: Thestral\_71 Start: 46874, Stop: 46461, Start Num: 21

Candidate Starts for Thestral\_71:

(Start: 21 @46874 has 84 MA's), (46, 46661), (51, 46625),

Gene: TinaBelcher\_69 Start: 46736, Stop: 46323, Start Num: 21

Candidate Starts for TinaBelcher\_69:

(Start: 21 @46736 has 84 MA's), (46, 46523), (51, 46487),

Gene: Toma\_70 Start: 47590, Stop: 47168, Start Num: 21

Candidate Starts for Toma\_70:

(4, 47710), (8, 47692), (Start: 13 @47623 has 2 MA's), (Start: 21 @47590 has 84 MA's), (35, 47479), (40, 47425), (45, 47380), (51, 47341), (52, 47326), (64, 47215),

Gene: Triste\_68 Start: 47731, Stop: 47312, Start Num: 21

Candidate Starts for Triste\_68:

(Start: 21 @47731 has 84 MA's), (23, 47722), (29, 47668), (37, 47608), (52, 47464), (54, 47416),

Gene: Triumph\_71 Start: 45546, Stop: 45148, Start Num: 20

Candidate Starts for Triumph\_71:

(Start: 20 @45546 has 4 MA's), (35, 45429), (37, 45417), (46, 45342), (52, 45291), (53, 45246), (61, 45204),

Gene: TrvxScott\_68 Start: 46841, Stop: 46428, Start Num: 21

Candidate Starts for TrvxScott\_68:

(Start: 21 @46841 has 84 MA's), (27, 46790), (46, 46628), (51, 46592),

Gene: TuanPN\_65 Start: 47683, Stop: 47264, Start Num: 21

Candidate Starts for TuanPN\_65:

(Start: 21 @47683 has 84 MA's), (23, 47674), (29, 47620), (37, 47560), (52, 47416), (54, 47368),

Gene: Unstoppable\_66 Start: 45394, Stop: 44975, Start Num: 21

Candidate Starts for Unstoppable\_66:

(Start: 13 @45430 has 2 MA's), (Start: 21 @45394 has 84 MA's), (35, 45283),

Gene: Urza\_75 Start: 47728, Stop: 47306, Start Num: 21

Candidate Starts for Urza\_75:

(17, 47746), (18, 47740), (Start: 21 @47728 has 84 MA's), (Start: 22 @47722 has 1 MA's), (37, 47605), (39, 47581), (44, 47539), (56, 47404), (58, 47395), (62, 47371), (64, 47350),

Gene: Vanseggelen\_75 Start: 45417, Stop: 45007, Start Num: 21

Candidate Starts for Vanseggelen\_75:

(Start: 21 @45417 has 84 MA's), (35, 45306), (37, 45294), (57, 45087), (64, 45039),

Gene: Verabelle\_72 Start: 44853, Stop: 44446, Start Num: 21

Candidate Starts for Verabelle\_72:

(Start: 21 @44853 has 84 MA's), (27, 44805), (28, 44796), (35, 44745), (37, 44733), (53, 44547), (55, 44535), (63, 44481), (64, 44475),

Gene: Verse\_70 Start: 46173, Stop: 45766, Start Num: 21

Candidate Starts for Verse\_70:

(Start: 12 @46209 has 2 MA's), (Start: 21 @46173 has 84 MA's), (28, 46116), (35, 46065), (37, 46053), (53, 45867), (55, 45855), (63, 45801),

Gene: VieEnRose\_74 Start: 47463, Stop: 47047, Start Num: 22

Candidate Starts for VieEnRose\_74:

(17, 47487), (18, 47481), (Start: 21 @47469 has 84 MA's), (Start: 22 @47463 has 1 MA's), (37, 47346), (39, 47322), (44, 47280), (56, 47145), (64, 47091),

Gene: Werner\_67 Start: 47729, Stop: 47310, Start Num: 21

Candidate Starts for Werner\_67:

(Start: 21 @47729 has 84 MA's), (23, 47720), (29, 47666), (37, 47606), (52, 47462), (54, 47414),

Gene: Whatever\_67 Start: 47754, Stop: 47335, Start Num: 21

Candidate Starts for Whatever\_67:

(Start: 21 @47754 has 84 MA's), (23, 47745), (29, 47691), (37, 47631), (52, 47487), (54, 47439),

Gene: Yasdnii\_67 Start: 47781, Stop: 47362, Start Num: 21

Candidate Starts for Yasdnii\_67:

(Start: 21 @47781 has 84 MA's), (23, 47772), (29, 47718), (37, 47658), (52, 47514), (54, 47466),

Gene: Yosif\_72 Start: 46394, Stop: 45975, Start Num: 21

Candidate Starts for Yosif\_72:

(15, 46427), (Start: 21 @46394 has 84 MA's), (37, 46268), (47, 46160), (52, 46124),

Gene: Zemlya\_70 Start: 47258, Stop: 46848, Start Num: 21

Candidate Starts for Zemlya\_70:

(Start: 21 @47258 has 84 MA's), (35, 47147), (37, 47135), (44, 47072), (56, 46937),

Gene: phiCAM\_66 Start: 46935, Stop: 46525, Start Num: 21

Candidate Starts for phiCAM\_66:

(Start: 21 @46935 has 84 MA's), (37, 46812), (44, 46746), (54, 46620), (64, 46557),