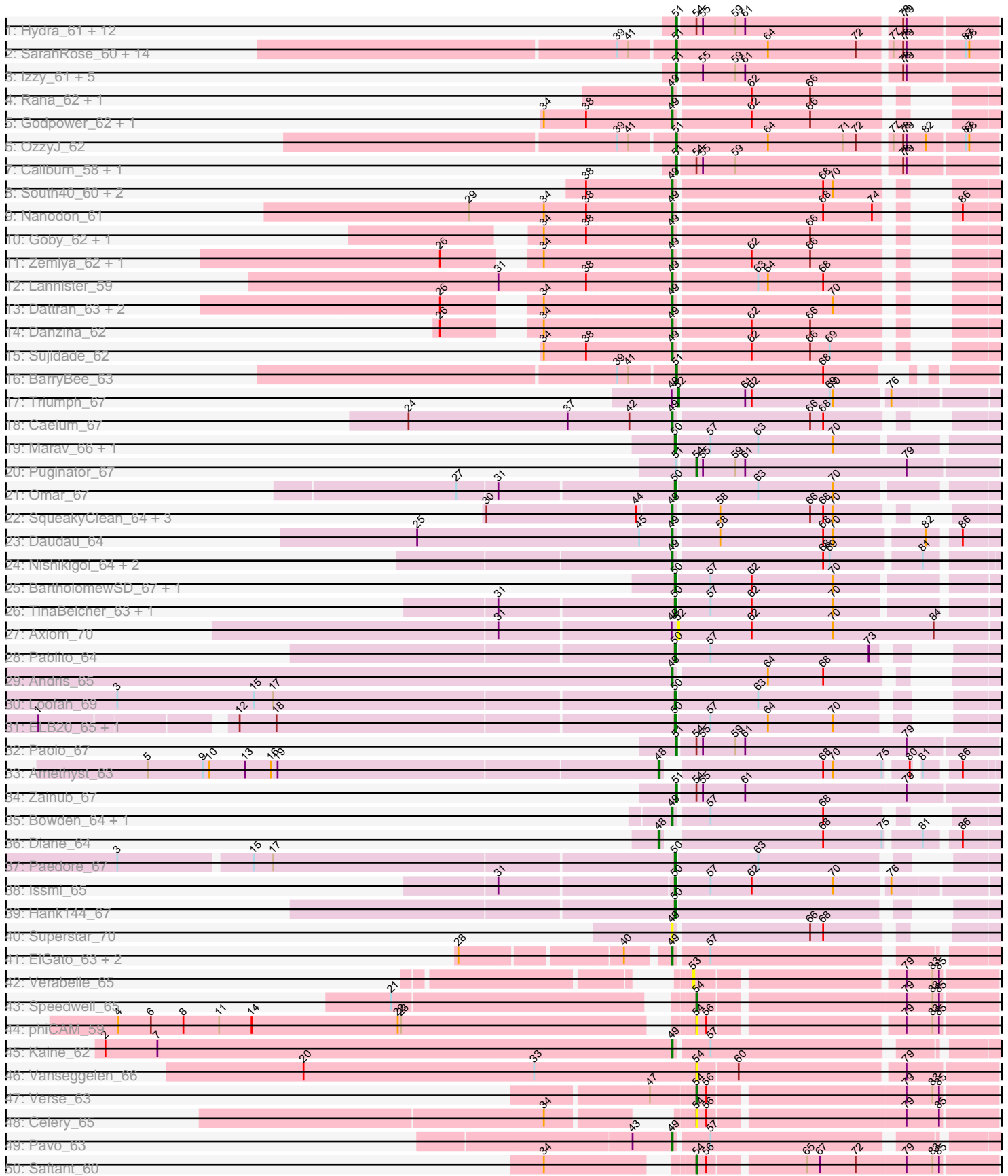
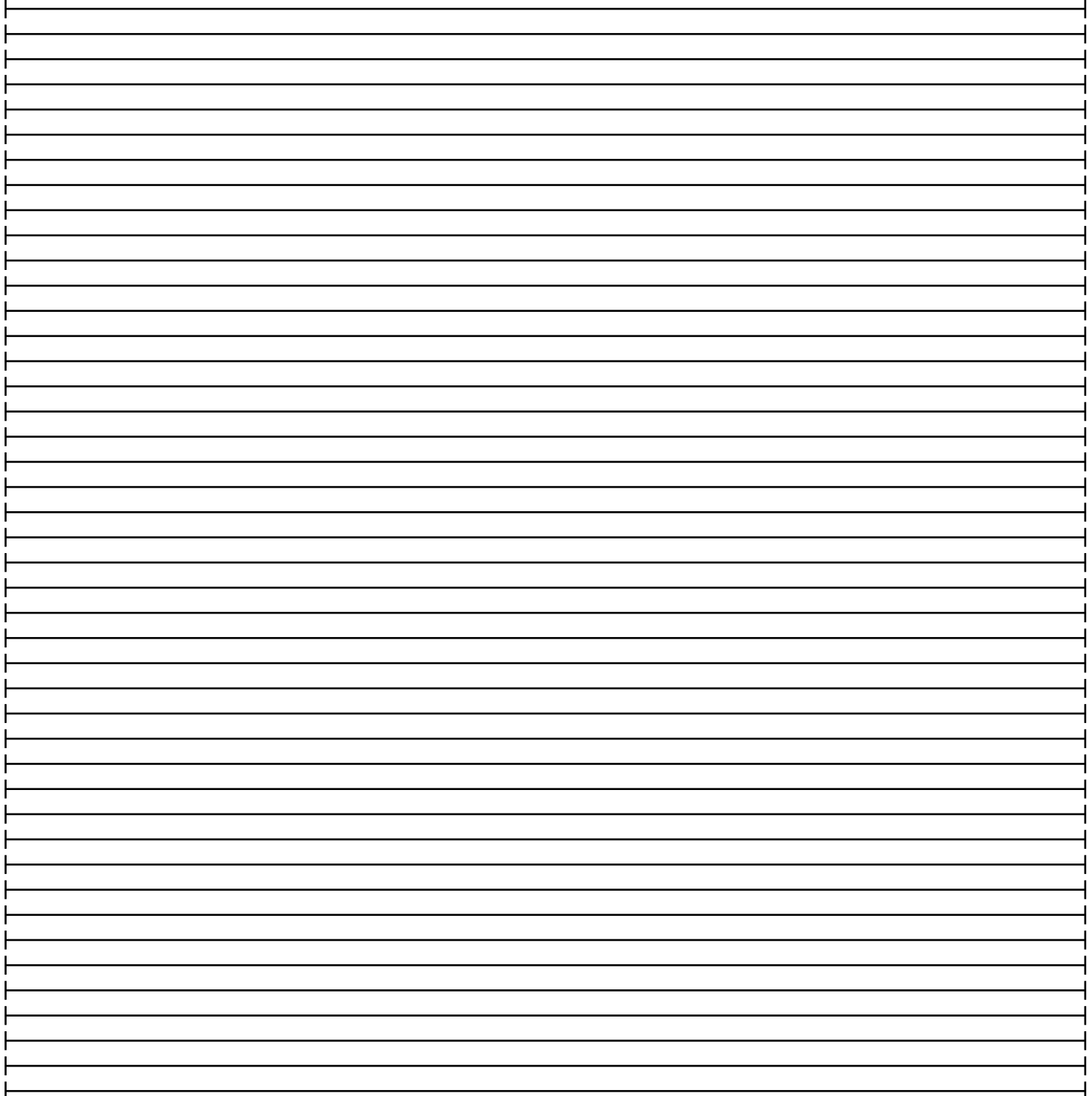
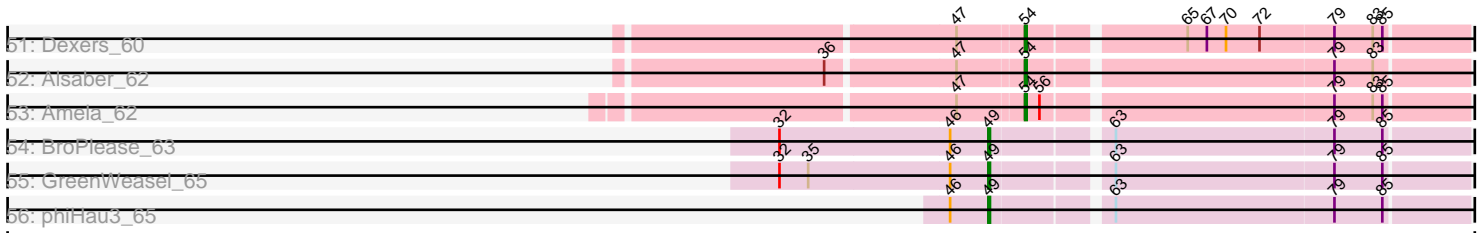


Pham 212472



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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 212472 Report

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

Pham number 212472 has 108 members, 7 are drafts.

Phages represented in each track:

- Track 1 : Hydra\_61, Legacy\_58, BeardedLady\_59, SunsetPointe\_58, Phettuccine\_59, Indigo\_58, Esperer\_60, Leviticus\_60, Nerdos\_58, EnochSoames\_63, Ozzie\_58, Unstoppable\_59, Aaronocolus\_59
- Track 2 : SarahRose\_60, Snorlax\_60, TagePhighter\_62, Whatever\_60, Emaanora\_63, Triste\_61, Asten\_60, Yasdnil\_60, Ejemplo\_58, Hippo\_60, Werner\_60, Dwayne\_60, TuanPN\_58, Chucky\_60, Maneekul\_60
- Track 3 : Izzy\_61, BryanRecycles\_61, Eddasa\_62, Rusticus\_61, Oliynyk\_61, Jash\_61
- Track 4 : Rana\_62, Lorelei\_61
- Track 5 : Godpower\_62, Lika\_61
- Track 6 : OzzyJ\_62
- Track 7 : Caliburn\_58, Bovely\_59
- Track 8 : South40\_60, Katalie\_60, RedBear\_61
- Track 9 : Nanodon\_61
- Track 10 : Goby\_62, Toma\_62
- Track 11 : Zemlya\_62, Brataylor\_63
- Track 12 : Lannister\_59
- Track 13 : Dattran\_63, Celeste\_62, Nabi\_62
- Track 14 : Danzina\_62
- Track 15 : Sujidade\_62
- Track 16 : BarryBee\_63
- Track 17 : Triumph\_67
- Track 18 : Caelum\_67
- Track 19 : Marav\_66, Jevington\_64
- Track 20 : Puginator\_67
- Track 21 : Omar\_67
- Track 22 : SqueakyClean\_64, GirlDinner\_63, Janus\_64, Animus\_63
- Track 23 : Daudau\_64
- Track 24 : Nishikigoi\_64, Tefunt\_63, Haizum\_63
- Track 25 : BartholomewSD\_67, Alvy\_67
- Track 26 : TinaBelcher\_63, Thestral\_65
- Track 27 : Axiom\_70
- Track 28 : Pablito\_64
- Track 29 : Andris\_65
- Track 30 : Loofah\_69
- Track 31 : ELB20\_65, R4\_66
- Track 32 : Paolo\_67

- Track 33 : Amethyst\_63
- Track 34 : Zainub\_67
- Track 35 : Bowden\_64, TrvxScott\_63
- Track 36 : Diane\_64
- Track 37 : Paedore\_67
- Track 38 : Issmi\_65
- Track 39 : Hank144\_67
- Track 40 : Superstar\_70
- Track 41 : ElGato\_63, Conan\_63, Provolone\_63
- Track 42 : Verabelle\_65
- Track 43 : Speedwell\_65
- Track 44 : phiCAM\_59
- Track 45 : Kaine\_62
- Track 46 : Vanseggelen\_66
- Track 47 : Verse\_63
- Track 48 : Celery\_65
- Track 49 : Pavo\_63
- Track 50 : Saftant\_60
- Track 51 : Dexers\_60
- Track 52 : Alsaber\_62
- Track 53 : Amela\_62
- Track 54 : BroPlease\_63
- Track 55 : GreenWeasel\_65
- Track 56 : phiHau3\_65

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

The start number called the most often in the published annotations is 51, it was called in 39 of the 101 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_59, Asten\_60, BarryBee\_63, BeardedLady\_59, Bovely\_59, BryanRecycles\_61, Caliburn\_58, Chucky\_60, Dwayne\_60, Eddasa\_62, Ejemplo\_58, Emaanora\_63, EnochSoames\_63, Esperer\_60, Hippo\_60, Hydra\_61, Indigo\_58, Izzy\_61, Jash\_61, Legacy\_58, Leviticus\_60, Maneekul\_60, Nerdos\_58, Oliynyk\_61, Ozzie\_58, OzzyJ\_62, Paolo\_67, Phettuccine\_59, Rusticus\_61, SarahRose\_60, Snorlax\_60, SunsetPointe\_58, TagePhighter\_62, Triste\_61, TuanPN\_58, Unstoppable\_59, Werner\_60, Whatever\_60, Yasdnil\_60, Zainub\_67,

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

- Puginator\_67,

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

- Alsaber\_62, Alvy\_67, Amela\_62, Amethyst\_63, Andris\_65, Animus\_63, Axiom\_70, BartholomewSD\_67, Bowden\_64, Brataylor\_63, BroPlease\_63, Caelum\_67, Celery\_65, Celeste\_62, Conan\_63, Danzina\_62, Dattran\_63, Daudau\_64, Dexers\_60, Diane\_64, ELB20\_65, ElGato\_63, GirlDinner\_63, Goby\_62, Godpower\_62, GreenWeasel\_65, Haizum\_63, Hank144\_67, Issmi\_65, Janus\_64, Jevington\_64, Kaine\_62, Katalie\_60, Lannister\_59, Lika\_61, Loofah\_69, Lorelei\_61, Marav\_66, Nabi\_62, Nanodon\_61, Nishikigoi\_64, Omar\_67, Pablito\_64, Paedore\_67,

Pavo\_63, Provolone\_63, R4\_66, Rana\_62, RedBear\_61, Saftant\_60, South40\_60, Speedwell\_65, SqueakyClean\_64, Sujidade\_62, Superstar\_70, Tefunt\_63, Thestral\_65, TinaBelcher\_63, Toma\_62, Triumph\_67, TrvxScott\_63, Vanseggelen\_66, Verabelle\_65, Verse\_63, Zemlya\_62, phiCAM\_59, phiHau3\_65,

### Summary by start number:

#### Start 48:

- Found in 2 of 108 ( 1.9% ) of genes in pham
- Manual Annotations of this start: 2 of 101
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amethyst\_63 (BD2), Diane\_64 (BD2),

#### Start 49:

- Found in 41 of 108 ( 38.0% ) of genes in pham
- Manual Annotations of this start: 38 of 101
- Called 95.1% of time when present
- Phage (with cluster) where this start called: Andris\_65 (BD2), Animus\_63 (BD2), Bowden\_64 (BD2), Brataylor\_63 (BD1), BroPlease\_63 (BD4), Caelum\_67 (BD2), Celeste\_62 (BD1), Conan\_63 (BD3), Danzina\_62 (BD1), Dattran\_63 (BD1), Daudau\_64 (BD2), ElGato\_63 (BD3), GirlDinner\_63 (BD2), Goby\_62 (BD1), Godpower\_62 (BD1), GreenWeasel\_65 (BD4), Haizum\_63 (BD2), Janus\_64 (BD2), Kaine\_62 (BD3), Katalie\_60 (BD1), Lannister\_59 (BD1), Lika\_61 (BD1), Lorelei\_61 (BD1), Nabi\_62 (BD1), Nanodon\_61 (BD1), Nishikigoi\_64 (BD2), Pavo\_63 (BD3), Provolone\_63 (BD3), Rana\_62 (BD1), RedBear\_61 (BD1), South40\_60 (BD1), SqueakyClean\_64 (BD2), Sujidade\_62 (BD1), Superstar\_70 (BD2), Tefunt\_63 (BD2), Toma\_62 (BD1), TrvxScott\_63 (BD2), Zemlya\_62 (BD1), phiHau3\_65 (BD4),

#### Start 50:

- Found in 14 of 108 ( 13.0% ) of genes in pham
- Manual Annotations of this start: 14 of 101
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Alvy\_67 (BD2), BartholomewSD\_67 (BD2), ELB20\_65 (BD2), Hank144\_67 (BD2), Issmi\_65 (BD2), Jevington\_64 (BD2), Loofah\_69 (BD2), Marav\_66 (BD2), Omar\_67 (BD2), Pablito\_64 (BD2), Paedore\_67 (BD2), R4\_66 (BD2), Thestral\_65 (BD2), TinaBelcher\_63 (BD2),

#### Start 51:

- Found in 41 of 108 ( 38.0% ) of genes in pham
- Manual Annotations of this start: 39 of 101
- Called 97.6% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_59 (BD1), Asten\_60 (BD1), BarryBee\_63 (BD1), BeardedLady\_59 (BD1), Bovely\_59 (BD1), BryanRecycles\_61 (BD1), Caliburn\_58 (BD1), Chucky\_60 (BD1), Dwayne\_60 (BD1), Eddasa\_62 (BD1), Ejemplo\_58 (BD1), Emaanora\_63 (BD1), EnochSoames\_63 (BD1), Esperer\_60 (BD1), Hippo\_60 (BD1), Hydra\_61 (BD1), Indigo\_58 (BD1), Izzy\_61 (BD1), Jash\_61 (BD1), Legacy\_58 (BD1), Leviticus\_60 (BD1), Maneekul\_60 (BD1), Nerdos\_58 (BD1), Oliynyk\_61 (BD1), Ozzie\_58 (BD1), OzzyJ\_62 (BD1), Paolo\_67 (BD2), Phettuccine\_59 (BD1), Rusticus\_61 (BD1), SarahRose\_60 (BD1), Snorlax\_60 (BD1), SunsetPointe\_58 (BD1), TagePhighter\_62 (BD1), Triste\_61 (BD1), TuanPN\_58 (BD1), Unstoppable\_59 (BD1), Werner\_60 (BD1), Whatever\_60 (BD1), Yasdnii\_60 (BD1), Zainub\_67 (BD2),

Start 52:

- Found in 2 of 108 ( 1.9% ) of genes in pham
- Manual Annotations of this start: 1 of 101
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Axiom\_70 (BD2), Triumph\_67 (BD2),

Start 53:

- Found in 1 of 108 ( 0.9% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Verabelle\_65 (BD3),

Start 54:

- Found in 27 of 108 ( 25.0% ) of genes in pham
- Manual Annotations of this start: 7 of 101
- Called 37.0% of time when present
- Phage (with cluster) where this start called: Alsaber\_62 (BD3), Amela\_62 (BD3), Celery\_65 (BD3), Dexers\_60 (BD3), Puginator\_67 (BD2), Saftant\_60 (BD3), Speedwell\_65 (BD3), Vanseggelen\_66 (BD3), Verse\_63 (BD3), phiCAM\_59 (BD3),

**Summary by clusters:**

There are 4 clusters represented in this pham: BD4, BD1, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 49 was manually annotated 18 times for cluster BD1.
- Start number 51 was manually annotated 37 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 48 was manually annotated 2 times for cluster BD2.
- Start number 49 was manually annotated 12 times for cluster BD2.
- Start number 50 was manually annotated 14 times for cluster BD2.
- Start number 51 was manually annotated 2 times for cluster BD2.
- Start number 52 was manually annotated 1 time for cluster BD2.
- Start number 54 was manually annotated 1 time for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 49 was manually annotated 5 times for cluster BD3.
- Start number 54 was manually annotated 6 times for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 49 was manually annotated 3 times for cluster BD4.

**Gene Information:**

Gene: Aaronocolus\_59 Start: 42586, Stop: 42305, Start Num: 51

Candidate Starts for Aaronocolus\_59:

(Start: 51 @42586 has 39 MA's), (Start: 54 @42571 has 7 MA's), (55, 42565), (59, 42535), (61, 42526), (78, 42388), (79, 42385),

Gene: Alsaber\_62 Start: 42249, Stop: 41989, Start Num: 54

Candidate Starts for Alsaber\_62:

(36, 42363), (47, 42288), (Start: 54 @42249 has 7 MA's), (79, 42069), (83, 42045),

Gene: Alvy\_67 Start: 44300, Stop: 44016, Start Num: 50

Candidate Starts for Alvy\_67:

(Start: 50 @44300 has 14 MA's), (57, 44270), (62, 44234), (70, 44159),

Gene: Amela\_62 Start: 43234, Stop: 42974, Start Num: 54

Candidate Starts for Amela\_62:

(47, 43273), (Start: 54 @43234 has 7 MA's), (56, 43225), (79, 43054), (83, 43030), (85, 43024),

Gene: Amethyst\_63 Start: 42442, Stop: 42170, Start Num: 48

Candidate Starts for Amethyst\_63:

(5, 42907), (9, 42856), (10, 42850), (13, 42817), (16, 42793), (19, 42787), (Start: 48 @42442 has 2 MA's), (68, 42310), (70, 42301), (75, 42256), (80, 42238), (81, 42235), (86, 42208),

Gene: Andris\_65 Start: 43276, Stop: 43028, Start Num: 49

Candidate Starts for Andris\_65:

(Start: 49 @43276 has 38 MA's), (64, 43195), (68, 43144),

Gene: Animus\_63 Start: 43498, Stop: 43250, Start Num: 49

Candidate Starts for Animus\_63:

(30, 43666), (44, 43528), (Start: 49 @43498 has 38 MA's), (58, 43459), (66, 43378), (68, 43366), (70, 43357),

Gene: Asten\_60 Start: 44843, Stop: 44562, Start Num: 51

Candidate Starts for Asten\_60:

(39, 44891), (41, 44882), (Start: 51 @44843 has 39 MA's), (64, 44762), (72, 44681), (77, 44654), (78, 44645), (79, 44642), (87, 44591), (88, 44588),

Gene: Axiom\_70 Start: 43691, Stop: 43389, Start Num: 52

Candidate Starts for Axiom\_70:

(31, 43853), (Start: 49 @43697 has 38 MA's), (Start: 52 @43691 has 1 MA's), (62, 43625), (70, 43550), (84, 43457),

Gene: BarryBee\_63 Start: 44820, Stop: 44581, Start Num: 51

Candidate Starts for BarryBee\_63:

(39, 44868), (41, 44859), (Start: 51 @44820 has 39 MA's), (68, 44688),

Gene: BartholomewSD\_67 Start: 43419, Stop: 43135, Start Num: 50

Candidate Starts for BartholomewSD\_67:

(Start: 50 @43419 has 14 MA's), (57, 43389), (62, 43353), (70, 43278),

Gene: BeardedLady\_59 Start: 42960, Stop: 42679, Start Num: 51

Candidate Starts for BeardedLady\_59:

(Start: 51 @42960 has 39 MA's), (Start: 54 @42945 has 7 MA's), (55, 42939), (59, 42909), (61, 42900), (78, 42762), (79, 42759),

Gene: Bovely\_59 Start: 42589, Stop: 42308, Start Num: 51

Candidate Starts for Bovely\_59:

(Start: 51 @42589 has 39 MA's), (Start: 54 @42574 has 7 MA's), (55, 42568), (59, 42538), (78, 42391), (79, 42388),

Gene: Bowden\_64 Start: 44219, Stop: 43971, Start Num: 49

Candidate Starts for Bowden\_64:

(Start: 49 @44219 has 38 MA's), (57, 44189), (68, 44087),

Gene: Brataylor\_63 Start: 44363, Stop: 44121, Start Num: 49

Candidate Starts for Brataylor\_63:

(26, 44546), (34, 44480), (Start: 49 @44363 has 38 MA's), (62, 44297), (66, 44243),

Gene: BroPlease\_63 Start: 42623, Stop: 42342, Start Num: 49

Candidate Starts for BroPlease\_63:

(32, 42752), (46, 42647), (Start: 49 @42623 has 38 MA's), (63, 42557), (79, 42422), (85, 42392),

Gene: BryanRecycles\_61 Start: 43076, Stop: 42795, Start Num: 51

Candidate Starts for BryanRecycles\_61:

(Start: 51 @43076 has 39 MA's), (55, 43055), (59, 43025), (61, 43016), (78, 42878), (79, 42875),

Gene: Caelum\_67 Start: 42912, Stop: 42673, Start Num: 49

Candidate Starts for Caelum\_67:

(24, 43155), (37, 43008), (42, 42951), (Start: 49 @42912 has 38 MA's), (66, 42792), (68, 42780),

Gene: Caliburn\_58 Start: 42690, Stop: 42409, Start Num: 51

Candidate Starts for Caliburn\_58:

(Start: 51 @42690 has 39 MA's), (Start: 54 @42675 has 7 MA's), (55, 42669), (59, 42639), (78, 42492), (79, 42489),

Gene: Celery\_65 Start: 42219, Stop: 41959, Start Num: 54

Candidate Starts for Celery\_65:

(34, 42309), (Start: 54 @42219 has 7 MA's), (56, 42210), (79, 42039), (85, 42009),

Gene: Celeste\_62 Start: 43828, Stop: 43586, Start Num: 49

Candidate Starts for Celeste\_62:

(26, 44011), (34, 43945), (Start: 49 @43828 has 38 MA's), (70, 43687),

Gene: Chucky\_60 Start: 44882, Stop: 44601, Start Num: 51

Candidate Starts for Chucky\_60:

(39, 44930), (41, 44921), (Start: 51 @44882 has 39 MA's), (64, 44801), (72, 44720), (77, 44693), (78, 44684), (79, 44681), (87, 44630), (88, 44627),

Gene: Conan\_63 Start: 42705, Stop: 42436, Start Num: 49

Candidate Starts for Conan\_63:

(28, 42876), (40, 42738), (Start: 49 @42705 has 38 MA's), (57, 42675),

Gene: Danzina\_62 Start: 44077, Stop: 43835, Start Num: 49

Candidate Starts for Danzina\_62:

(26, 44260), (34, 44194), (Start: 49 @44077 has 38 MA's), (62, 44011), (66, 43957),

Gene: Dattran\_63 Start: 44219, Stop: 43977, Start Num: 49

Candidate Starts for Dattran\_63:

(26, 44402), (34, 44336), (Start: 49 @44219 has 38 MA's), (70, 44078),

Gene: Daudau\_64 Start: 42829, Stop: 42545, Start Num: 49

Candidate Starts for Daudau\_64:



(25, 43063), (45, 42859), (Start: 49 @42829 has 38 MA's), (58, 42790), (68, 42697), (70, 42688), (82, 42610), (86, 42586),

Gene: Dexers\_60 Start: 42491, Stop: 42231, Start Num: 54

Candidate Starts for Dexers\_60:

(47, 42530), (Start: 54 @42491 has 7 MA's), (65, 42401), (67, 42389), (70, 42377), (72, 42356), (79, 42311), (83, 42287), (85, 42281),

Gene: Diane\_64 Start: 43528, Stop: 43250, Start Num: 48

Candidate Starts for Diane\_64:

(Start: 48 @43528 has 2 MA's), (68, 43396), (75, 43342), (81, 43312), (86, 43285),

Gene: Dwayne\_60 Start: 44870, Stop: 44589, Start Num: 51

Candidate Starts for Dwayne\_60:

(39, 44918), (41, 44909), (Start: 51 @44870 has 39 MA's), (64, 44789), (72, 44708), (77, 44681), (78, 44672), (79, 44669), (87, 44618), (88, 44615),

Gene: ELB20\_65 Start: 43636, Stop: 43394, Start Num: 50

Candidate Starts for ELB20\_65:

(1, 44191), (12, 44029), (18, 43996), (Start: 50 @43636 has 14 MA's), (57, 43606), (64, 43555), (70, 43495),

Gene: Eddasa\_62 Start: 43615, Stop: 43334, Start Num: 51

Candidate Starts for Eddasa\_62:

(Start: 51 @43615 has 39 MA's), (55, 43594), (59, 43564), (61, 43555), (78, 43417), (79, 43414),

Gene: Ejemplo\_58 Start: 44808, Stop: 44527, Start Num: 51

Candidate Starts for Ejemplo\_58:

(39, 44856), (41, 44847), (Start: 51 @44808 has 39 MA's), (64, 44727), (72, 44646), (77, 44619), (78, 44610), (79, 44607), (87, 44556), (88, 44553),

Gene: ElGato\_63 Start: 42576, Stop: 42307, Start Num: 49

Candidate Starts for ElGato\_63:

(28, 42747), (40, 42609), (Start: 49 @42576 has 38 MA's), (57, 42546),

Gene: Emaanora\_63 Start: 44793, Stop: 44512, Start Num: 51

Candidate Starts for Emaanora\_63:

(39, 44841), (41, 44832), (Start: 51 @44793 has 39 MA's), (64, 44712), (72, 44631), (77, 44604), (78, 44595), (79, 44592), (87, 44541), (88, 44538),

Gene: EnochSoames\_63 Start: 42872, Stop: 42591, Start Num: 51

Candidate Starts for EnochSoames\_63:

(Start: 51 @42872 has 39 MA's), (Start: 54 @42857 has 7 MA's), (55, 42851), (59, 42821), (61, 42812), (78, 42674), (79, 42671),

Gene: Esperer\_60 Start: 42932, Stop: 42651, Start Num: 51

Candidate Starts for Esperer\_60:

(Start: 51 @42932 has 39 MA's), (Start: 54 @42917 has 7 MA's), (55, 42911), (59, 42881), (61, 42872), (78, 42734), (79, 42731),

Gene: GirlDinner\_63 Start: 42999, Stop: 42751, Start Num: 49

Candidate Starts for GirlDinner\_63:

(30, 43167), (44, 43029), (Start: 49 @42999 has 38 MA's), (58, 42960), (66, 42879), (68, 42867), (70, 42858),

Gene: Goby\_62 Start: 44645, Stop: 44403, Start Num: 49

Candidate Starts for Goby\_62:

(34, 44762), (38, 44723), (Start: 49 @44645 has 38 MA's), (66, 44525),

Gene: Godpower\_62 Start: 43921, Stop: 43679, Start Num: 49

Candidate Starts for Godpower\_62:

(34, 44038), (38, 43999), (Start: 49 @43921 has 38 MA's), (62, 43855), (66, 43801),

Gene: GreenWeasel\_65 Start: 42628, Stop: 42347, Start Num: 49

Candidate Starts for GreenWeasel\_65:

(32, 42757), (35, 42739), (46, 42652), (Start: 49 @42628 has 38 MA's), (63, 42562), (79, 42427), (85, 42397),

Gene: Haizum\_63 Start: 43248, Stop: 42967, Start Num: 49

Candidate Starts for Haizum\_63:

(Start: 49 @43248 has 38 MA's), (68, 43116), (69, 43110), (81, 43032),

Gene: Hank144\_67 Start: 44032, Stop: 43793, Start Num: 50

Candidate Starts for Hank144\_67:

(Start: 50 @44032 has 14 MA's),

Gene: Hippo\_60 Start: 44856, Stop: 44575, Start Num: 51

Candidate Starts for Hippo\_60:

(39, 44904), (41, 44895), (Start: 51 @44856 has 39 MA's), (64, 44775), (72, 44694), (77, 44667), (78, 44658), (79, 44655), (87, 44604), (88, 44601),

Gene: Hydra\_61 Start: 43768, Stop: 43487, Start Num: 51

Candidate Starts for Hydra\_61:

(Start: 51 @43768 has 39 MA's), (Start: 54 @43753 has 7 MA's), (55, 43747), (59, 43717), (61, 43708), (78, 43570), (79, 43567),

Gene: Indigo\_58 Start: 42582, Stop: 42301, Start Num: 51

Candidate Starts for Indigo\_58:

(Start: 51 @42582 has 39 MA's), (Start: 54 @42567 has 7 MA's), (55, 42561), (59, 42531), (61, 42522), (78, 42384), (79, 42381),

Gene: Issmi\_65 Start: 43195, Stop: 42905, Start Num: 50

Candidate Starts for Issmi\_65:

(31, 43351), (Start: 50 @43195 has 14 MA's), (57, 43165), (62, 43129), (70, 43054), (76, 43006),

Gene: Izzy\_61 Start: 43123, Stop: 42842, Start Num: 51

Candidate Starts for Izzy\_61:

(Start: 51 @43123 has 39 MA's), (55, 43102), (59, 43072), (61, 43063), (78, 42925), (79, 42922),

Gene: Janus\_64 Start: 43339, Stop: 43091, Start Num: 49

Candidate Starts for Janus\_64:

(30, 43507), (44, 43369), (Start: 49 @43339 has 38 MA's), (58, 43300), (66, 43219), (68, 43207), (70, 43198),

Gene: Jash\_61 Start: 43076, Stop: 42795, Start Num: 51

Candidate Starts for Jash\_61:

(Start: 51 @43076 has 39 MA's), (55, 43055), (59, 43025), (61, 43016), (78, 42878), (79, 42875),

Gene: Jevington\_64 Start: 41849, Stop: 41562, Start Num: 50

Candidate Starts for Jevington\_64:

(Start: 50 @41849 has 14 MA's), (57, 41819), (63, 41777), (70, 41708),

Gene: Kaine\_62 Start: 42410, Stop: 42141, Start Num: 49

Candidate Starts for Kaine\_62:

(2, 42929), (7, 42881), (Start: 49 @42410 has 38 MA's), (57, 42380),

Gene: Katalie\_60 Start: 45065, Stop: 44826, Start Num: 49

Candidate Starts for Katalie\_60:

(38, 45143), (Start: 49 @45065 has 38 MA's), (68, 44933), (70, 44924),

Gene: Lannister\_59 Start: 43435, Stop: 43193, Start Num: 49

Candidate Starts for Lannister\_59:

(31, 43594), (38, 43513), (Start: 49 @43435 has 38 MA's), (63, 43363), (64, 43354), (68, 43303),

Gene: Legacy\_58 Start: 42681, Stop: 42400, Start Num: 51

Candidate Starts for Legacy\_58:

(Start: 51 @42681 has 39 MA's), (Start: 54 @42666 has 7 MA's), (55, 42660), (59, 42630), (61, 42621), (78, 42483), (79, 42480),

Gene: Leviticus\_60 Start: 43119, Stop: 42838, Start Num: 51

Candidate Starts for Leviticus\_60:

(Start: 51 @43119 has 39 MA's), (Start: 54 @43104 has 7 MA's), (55, 43098), (59, 43068), (61, 43059), (78, 42921), (79, 42918),

Gene: Lika\_61 Start: 44474, Stop: 44232, Start Num: 49

Candidate Starts for Lika\_61:

(34, 44591), (38, 44552), (Start: 49 @44474 has 38 MA's), (62, 44408), (66, 44354),

Gene: Loofah\_69 Start: 44483, Stop: 44238, Start Num: 50

Candidate Starts for Loofah\_69:

(3, 44990), (15, 44864), (17, 44846), (Start: 50 @44483 has 14 MA's), (63, 44411),

Gene: Lorelei\_61 Start: 43835, Stop: 43593, Start Num: 49

Candidate Starts for Lorelei\_61:

(Start: 49 @43835 has 38 MA's), (62, 43769), (66, 43715),

Gene: Maneekul\_60 Start: 44886, Stop: 44605, Start Num: 51

Candidate Starts for Maneekul\_60:

(39, 44934), (41, 44925), (Start: 51 @44886 has 39 MA's), (64, 44805), (72, 44724), (77, 44697), (78, 44688), (79, 44685), (87, 44634), (88, 44631),

Gene: Marav\_66 Start: 42372, Stop: 42085, Start Num: 50

Candidate Starts for Marav\_66:

(Start: 50 @42372 has 14 MA's), (57, 42342), (63, 42300), (70, 42231),

Gene: Nabi\_62 Start: 44368, Stop: 44129, Start Num: 49

Candidate Starts for Nabi\_62:

(26, 44551), (34, 44485), (Start: 49 @44368 has 38 MA's), (70, 44227),

Gene: Nanodon\_61 Start: 43459, Stop: 43217, Start Num: 49

Candidate Starts for Nanodon\_61:

(29, 43645), (34, 43576), (38, 43537), (Start: 49 @43459 has 38 MA's), (68, 43327), (74, 43282), (86, 43252),

Gene: Nerdos\_58 Start: 42581, Stop: 42300, Start Num: 51

Candidate Starts for Nerdos\_58:

(Start: 51 @42581 has 39 MA's), (Start: 54 @42566 has 7 MA's), (55, 42560), (59, 42530), (61, 42521), (78, 42383), (79, 42380),

Gene: Nishikigoi\_64 Start: 43248, Stop: 42967, Start Num: 49

Candidate Starts for Nishikigoi\_64:

(Start: 49 @43248 has 38 MA's), (68, 43116), (69, 43110), (81, 43032),

Gene: Oliynyk\_61 Start: 43076, Stop: 42795, Start Num: 51

Candidate Starts for Oliynyk\_61:

(Start: 51 @43076 has 39 MA's), (55, 43055), (59, 43025), (61, 43016), (78, 42878), (79, 42875),

Gene: Omar\_67 Start: 41635, Stop: 41354, Start Num: 50

Candidate Starts for Omar\_67:

(27, 41830), (31, 41794), (Start: 50 @41635 has 14 MA's), (63, 41563), (70, 41494),

Gene: Ozzie\_58 Start: 42690, Stop: 42409, Start Num: 51

Candidate Starts for Ozzie\_58:

(Start: 51 @42690 has 39 MA's), (Start: 54 @42675 has 7 MA's), (55, 42669), (59, 42639), (61, 42630), (78, 42492), (79, 42489),

Gene: OzzyJ\_62 Start: 44783, Stop: 44502, Start Num: 51

Candidate Starts for OzzyJ\_62:

(39, 44831), (41, 44822), (Start: 51 @44783 has 39 MA's), (64, 44702), (71, 44633), (72, 44621), (77, 44594), (78, 44585), (79, 44582), (82, 44564), (87, 44531), (88, 44528),

Gene: Pablito\_64 Start: 42647, Stop: 42402, Start Num: 50

Candidate Starts for Pablito\_64:

(Start: 50 @42647 has 14 MA's), (57, 42617), (73, 42473),

Gene: Paedore\_67 Start: 44040, Stop: 43795, Start Num: 50

Candidate Starts for Paedore\_67:

(3, 44538), (15, 44421), (17, 44403), (Start: 50 @44040 has 14 MA's), (63, 43968),

Gene: Paolo\_67 Start: 43540, Stop: 43253, Start Num: 51

Candidate Starts for Paolo\_67:

(Start: 51 @43540 has 39 MA's), (Start: 54 @43525 has 7 MA's), (55, 43519), (59, 43489), (61, 43480), (79, 43333),

Gene: Pavo\_63 Start: 42461, Stop: 42192, Start Num: 49

Candidate Starts for Pavo\_63:

(43, 42497), (Start: 49 @42461 has 38 MA's), (57, 42431),

Gene: Phettuccine\_59 Start: 42582, Stop: 42301, Start Num: 51

Candidate Starts for Phettuccine\_59:

(Start: 51 @42582 has 39 MA's), (Start: 54 @42567 has 7 MA's), (55, 42561), (59, 42531), (61, 42522), (78, 42384), (79, 42381),

Gene: Provolone\_63 Start: 42788, Stop: 42519, Start Num: 49  
Candidate Starts for Provolone\_63:  
(28, 42959), (40, 42821), (Start: 49 @42788 has 38 MA's), (57, 42758),

Gene: Puginator\_67 Start: 43574, Stop: 43302, Start Num: 54  
Candidate Starts for Puginator\_67:  
(Start: 51 @43589 has 39 MA's), (Start: 54 @43574 has 7 MA's), (55, 43568), (59, 43538), (61, 43529), (79, 43382),

Gene: R4\_66 Start: 43796, Stop: 43554, Start Num: 50  
Candidate Starts for R4\_66:  
(1, 44351), (12, 44189), (18, 44156), (Start: 50 @43796 has 14 MA's), (57, 43766), (64, 43715), (70, 43655),

Gene: Rana\_62 Start: 44257, Stop: 44015, Start Num: 49  
Candidate Starts for Rana\_62:  
(Start: 49 @44257 has 38 MA's), (62, 44191), (66, 44137),

Gene: RedBear\_61 Start: 45065, Stop: 44826, Start Num: 49  
Candidate Starts for RedBear\_61:  
(38, 45143), (Start: 49 @45065 has 38 MA's), (68, 44933), (70, 44924),

Gene: Rusticus\_61 Start: 43076, Stop: 42795, Start Num: 51  
Candidate Starts for Rusticus\_61:  
(Start: 51 @43076 has 39 MA's), (55, 43055), (59, 43025), (61, 43016), (78, 42878), (79, 42875),

Gene: Saftant\_60 Start: 42366, Stop: 42106, Start Num: 54  
Candidate Starts for Saftant\_60:  
(34, 42477), (Start: 54 @42366 has 7 MA's), (56, 42357), (65, 42276), (67, 42264), (72, 42231), (79, 42186), (83, 42162), (85, 42156),

Gene: SarahRose\_60 Start: 44855, Stop: 44574, Start Num: 51  
Candidate Starts for SarahRose\_60:  
(39, 44903), (41, 44894), (Start: 51 @44855 has 39 MA's), (64, 44774), (72, 44693), (77, 44666), (78, 44657), (79, 44654), (87, 44603), (88, 44600),

Gene: Snorlax\_60 Start: 44880, Stop: 44599, Start Num: 51  
Candidate Starts for Snorlax\_60:  
(39, 44928), (41, 44919), (Start: 51 @44880 has 39 MA's), (64, 44799), (72, 44718), (77, 44691), (78, 44682), (79, 44679), (87, 44628), (88, 44625),

Gene: South40\_60 Start: 45065, Stop: 44826, Start Num: 49  
Candidate Starts for South40\_60:  
(38, 45143), (Start: 49 @45065 has 38 MA's), (68, 44933), (70, 44924),

Gene: Speedwell\_65 Start: 43422, Stop: 43162, Start Num: 54  
Candidate Starts for Speedwell\_65:  
(21, 43668), (Start: 54 @43422 has 7 MA's), (79, 43242), (83, 43218), (85, 43212),

Gene: SqueakyClean\_64 Start: 43517, Stop: 43269, Start Num: 49

Candidate Starts for SqueakyClean\_64:

(30, 43685), (44, 43547), (Start: 49 @43517 has 38 MA's), (58, 43478), (66, 43397), (68, 43385), (70, 43376),

Gene: Sujidade\_62 Start: 44709, Stop: 44467, Start Num: 49

Candidate Starts for Sujidade\_62:

(34, 44826), (38, 44787), (Start: 49 @44709 has 38 MA's), (62, 44643), (66, 44589), (69, 44571),

Gene: SunsetPointe\_58 Start: 42697, Stop: 42416, Start Num: 51

Candidate Starts for SunsetPointe\_58:

(Start: 51 @42697 has 39 MA's), (Start: 54 @42682 has 7 MA's), (55, 42676), (59, 42646), (61, 42637), (78, 42499), (79, 42496),

Gene: Superstar\_70 Start: 43430, Stop: 43185, Start Num: 49

Candidate Starts for Superstar\_70:

(Start: 49 @43430 has 38 MA's), (66, 43310), (68, 43298),

Gene: TagePhighter\_62 Start: 44856, Stop: 44575, Start Num: 51

Candidate Starts for TagePhighter\_62:

(39, 44904), (41, 44895), (Start: 51 @44856 has 39 MA's), (64, 44775), (72, 44694), (77, 44667), (78, 44658), (79, 44655), (87, 44604), (88, 44601),

Gene: Tefunt\_63 Start: 43162, Stop: 42881, Start Num: 49

Candidate Starts for Tefunt\_63:

(Start: 49 @43162 has 38 MA's), (68, 43030), (69, 43024), (81, 42946),

Gene: Thestral\_65 Start: 43960, Stop: 43676, Start Num: 50

Candidate Starts for Thestral\_65:

(31, 44119), (Start: 50 @43960 has 14 MA's), (57, 43930), (62, 43894), (70, 43819),

Gene: TinaBelcher\_63 Start: 43827, Stop: 43543, Start Num: 50

Candidate Starts for TinaBelcher\_63:

(31, 43986), (Start: 50 @43827 has 14 MA's), (57, 43797), (62, 43761), (70, 43686),

Gene: Toma\_62 Start: 44648, Stop: 44406, Start Num: 49

Candidate Starts for Toma\_62:

(34, 44765), (38, 44726), (Start: 49 @44648 has 38 MA's), (66, 44528),

Gene: Triste\_61 Start: 44855, Stop: 44574, Start Num: 51

Candidate Starts for Triste\_61:

(39, 44903), (41, 44894), (Start: 51 @44855 has 39 MA's), (64, 44774), (72, 44693), (77, 44666), (78, 44657), (79, 44654), (87, 44603), (88, 44600),

Gene: Triumph\_67 Start: 43755, Stop: 43465, Start Num: 52

Candidate Starts for Triumph\_67:

(Start: 49 @43761 has 38 MA's), (Start: 52 @43755 has 1 MA's), (61, 43695), (62, 43689), (69, 43617), (70, 43614), (76, 43566),

Gene: TrvxScott\_63 Start: 44213, Stop: 43965, Start Num: 49

Candidate Starts for TrvxScott\_63:

(Start: 49 @44213 has 38 MA's), (57, 44183), (68, 44081),

Gene: TuanPN\_58 Start: 44808, Stop: 44527, Start Num: 51

Candidate Starts for TuanPN\_58:

(39, 44856), (41, 44847), (Start: 51 @44808 has 39 MA's), (64, 44727), (72, 44646), (77, 44619), (78, 44610), (79, 44607), (87, 44556), (88, 44553),

Gene: Unstoppable\_59 Start: 42580, Stop: 42299, Start Num: 51

Candidate Starts for Unstoppable\_59:

(Start: 51 @42580 has 39 MA's), (Start: 54 @42565 has 7 MA's), (55, 42559), (59, 42529), (61, 42520), (78, 42382), (79, 42379),

Gene: Vanseggelen\_66 Start: 42112, Stop: 41849, Start Num: 54

Candidate Starts for Vanseggelen\_66:

(20, 42472), (33, 42259), (Start: 54 @42112 has 7 MA's), (60, 42076), (79, 41929),

Gene: Verabelle\_65 Start: 41980, Stop: 41723, Start Num: 53

Candidate Starts for Verabelle\_65:

(53, 41980), (79, 41803), (83, 41779), (85, 41773),

Gene: Verse\_63 Start: 43225, Stop: 42965, Start Num: 54

Candidate Starts for Verse\_63:

(47, 43264), (Start: 54 @43225 has 7 MA's), (56, 43216), (79, 43045), (83, 43021), (85, 43015),

Gene: Werner\_60 Start: 44853, Stop: 44572, Start Num: 51

Candidate Starts for Werner\_60:

(39, 44901), (41, 44892), (Start: 51 @44853 has 39 MA's), (64, 44772), (72, 44691), (77, 44664), (78, 44655), (79, 44652), (87, 44601), (88, 44598),

Gene: Whatever\_60 Start: 44879, Stop: 44598, Start Num: 51

Candidate Starts for Whatever\_60:

(39, 44927), (41, 44918), (Start: 51 @44879 has 39 MA's), (64, 44798), (72, 44717), (77, 44690), (78, 44681), (79, 44678), (87, 44627), (88, 44624),

Gene: Yasdniil\_60 Start: 44905, Stop: 44624, Start Num: 51

Candidate Starts for Yasdniil\_60:

(39, 44953), (41, 44944), (Start: 51 @44905 has 39 MA's), (64, 44824), (72, 44743), (77, 44716), (78, 44707), (79, 44704), (87, 44653), (88, 44650),

Gene: Zainub\_67 Start: 43515, Stop: 43228, Start Num: 51

Candidate Starts for Zainub\_67:

(Start: 51 @43515 has 39 MA's), (Start: 54 @43500 has 7 MA's), (55, 43494), (61, 43455), (79, 43308),

Gene: Zemlya\_62 Start: 44382, Stop: 44140, Start Num: 49

Candidate Starts for Zemlya\_62:

(26, 44565), (34, 44499), (Start: 49 @44382 has 38 MA's), (62, 44316), (66, 44262),

Gene: phiCAM\_59 Start: 44024, Stop: 43770, Start Num: 54

Candidate Starts for phiCAM\_59:

(4, 44528), (6, 44498), (8, 44468), (11, 44435), (14, 44405), (22, 44270), (23, 44267), (Start: 54 @44024 has 7 MA's), (56, 44015), (79, 43850), (83, 43826), (85, 43820),

Gene: phiHau3\_65 Start: 43045, Stop: 42764, Start Num: 49

Candidate Starts for phiHau3\_65:

(46, 43069), (Start: 49 @43045 has 38 MA's), (63, 42979), (79, 42844), (85, 42814),