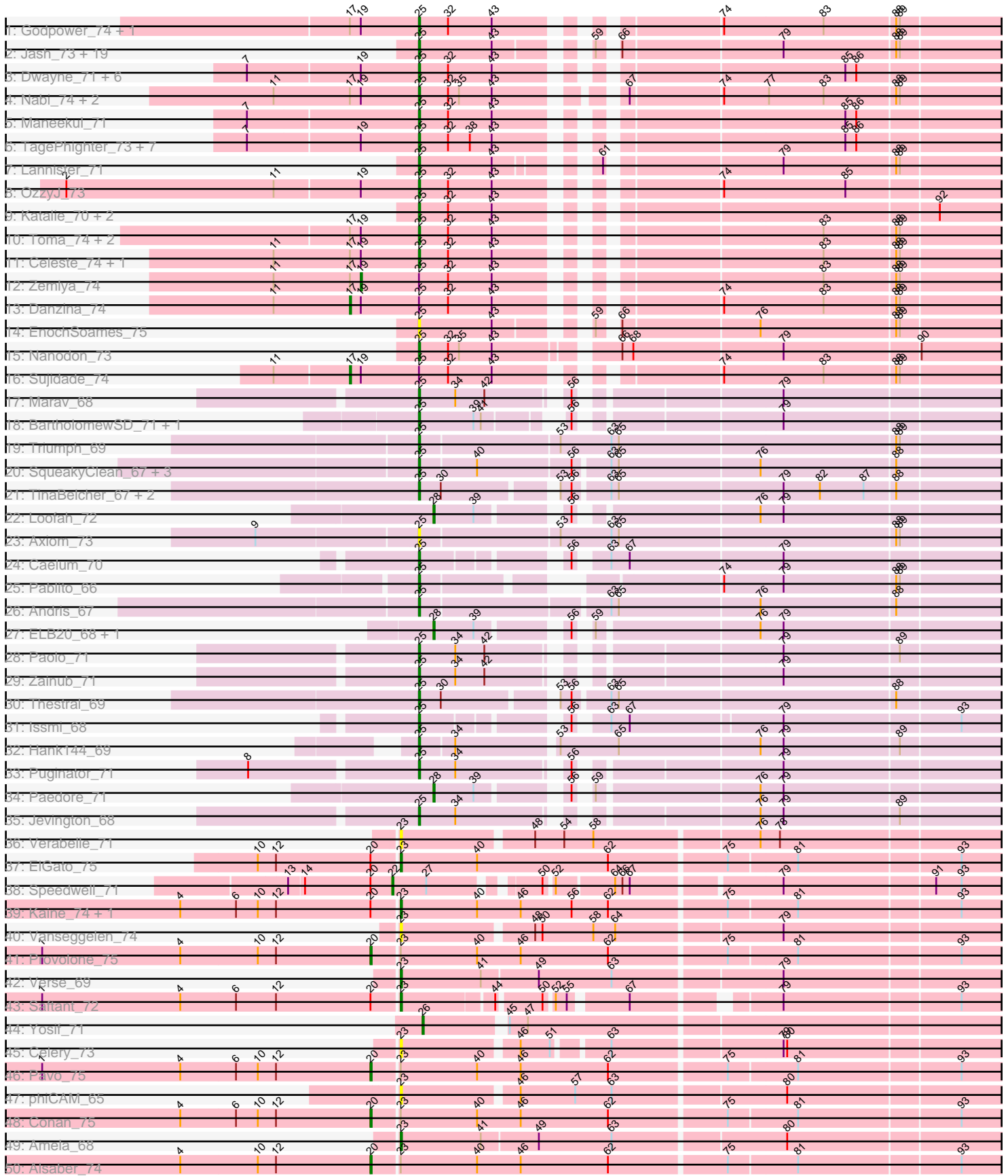


Pham 200115





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 200115 Report

This analysis was run 01/18/25 on database version 583.

Pham number 200115 has 105 members, 6 are drafts.

Phages represented in each track:

- Track 1 : Godpower\_74, Lika\_73
- Track 2 : Jash\_73, Unstoppable\_71, Leviticus\_72, Ozzie\_71, Hydra\_74, Phettuccine\_71, Aaronocolus\_71, Bovely\_71, BryanRecycles\_73, Izzy\_73, Eddasa\_74, Indigo\_70, Oliynyk\_73, Legacy\_71, Rusticus\_73, Nerdos\_70, Caliburn\_70, BeardedLady\_72, Esperer\_72, SunsetPointe\_71
- Track 3 : Dwayne\_71, BarryBee\_74, Ejemplo\_69, Asten\_71, Yasdnih\_71, TuanPN\_69, Hippo\_71
- Track 4 : Nabi\_74, Rana\_74, Lorelei\_73
- Track 5 : Maneekul\_71
- Track 6 : TagerPighther\_73, SarahRose\_71, Triste\_72, Whatever\_71, Emaanora\_74, Snorlax\_71, Werner\_71, Chucky\_71
- Track 7 : Lannister\_71
- Track 8 : OzzyJ\_73
- Track 9 : Katalie\_70, South40\_70, RedBear\_71
- Track 10 : Toma\_74, Goby\_74, Dattran\_75
- Track 11 : Celeste\_74, Brataylor\_75
- Track 12 : Zemlya\_74
- Track 13 : Danzina\_74
- Track 14 : EnochSoames\_75
- Track 15 : Nanodon\_73
- Track 16 : Sujidade\_74
- Track 17 : Marav\_68
- Track 18 : BartholomewSD\_71, Alvy\_71
- Track 19 : Triumph\_69
- Track 20 : SqueakyClean\_67, GirlDinner\_66, Janus\_67, Animus\_66
- Track 21 : TinaBelcher\_67, Bowden\_67, TrvxScott\_66
- Track 22 : Loofah\_72
- Track 23 : Axiom\_73
- Track 24 : Caelum\_70
- Track 25 : Pablito\_66
- Track 26 : Andris\_67
- Track 27 : ELB20\_68, R4\_69
- Track 28 : Paolo\_71
- Track 29 : Zainub\_71
- Track 30 : Thestral\_69
- Track 31 : Issmi\_68
- Track 32 : Hank144\_69

- Track 33 : Puginator\_71
- Track 34 : Paedore\_71
- Track 35 : Jevington\_68
- Track 36 : Verabelle\_71
- Track 37 : ElGato\_75
- Track 38 : Speedwell\_71
- Track 39 : Kaine\_74, Dexers\_72
- Track 40 : Vanseggelen\_74
- Track 41 : Provolone\_75
- Track 42 : Verse\_69
- Track 43 : Saftant\_72
- Track 44 : Yosif\_71
- Track 45 : Celery\_73
- Track 46 : Pavo\_75
- Track 47 : phiCAM\_65
- Track 48 : Conan\_75
- Track 49 : Amela\_68
- Track 50 : Alsaber\_74
- Track 51 : BroPlease\_65
- Track 52 : GreenWeasel\_67
- Track 53 : phiHau3\_67
- Track 54 : Celia\_71
- Track 55 : Urza\_73
- Track 56 : VieEnRose\_72
- Track 57 : Itza\_74

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

The start number called the most often in the published annotations is 25, it was called in 73 of the 99 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Aaronocolus\_71, Alvy\_71, Andris\_67, Animus\_66, Asten\_71, Axiom\_73, BarryBee\_74, BartholomewSD\_71, BeardedLady\_72, Bovely\_71, Bowden\_67, Brataylor\_75, BryanRecycles\_73, Caelum\_70, Caliburn\_70, Celeste\_74, Chucky\_71, Dattran\_75, Dwayne\_71, Eddasa\_74, Ejemplo\_69, Emaanora\_74, EnochSoames\_75, Esperer\_72, GirlDinner\_66, Goby\_74, Godpower\_74, Hank144\_69, Hippo\_71, Hydra\_74, Indigo\_70, Issmi\_68, Izzy\_73, Janus\_67, Jash\_73, Jevington\_68, Katalie\_70, Lannister\_71, Legacy\_71, Leviticus\_72, Lika\_73, Lorelei\_73, Maneekul\_71, Marav\_68, Nabi\_74, Nanodon\_73, Nerdos\_70, Oliynyk\_73, Ozzie\_71, OzzyJ\_73, Pablito\_66, Paolo\_71, Phettuccine\_71, Puginator\_71, Rana\_74, RedBear\_71, Rusticus\_73, SarahRose\_71, Snorlax\_71, South40\_70, SqueakyClean\_67, SunsetPointe\_71, TagePhighter\_73, Thestral\_69, TinaBelcher\_67, Toma\_74, Triste\_72, Triumph\_69, TrvxScott\_66, TuanPN\_69, Unstoppable\_71, Werner\_71, Whatever\_71, Yasdnil\_71, Zainub\_71,

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

- Danzina\_74, Sujidade\_74, Zemlya\_74,

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

- Alsaber\_74, Amela\_68, BroPlease\_65, Celery\_73, Celia\_71, Conan\_75, Dexers\_72, ELB20\_68, ElGato\_75, GreenWeasel\_67, Itza\_74, Kaine\_74, Loofah\_72, Paedore\_71, Pavo\_75, Provolone\_75, R4\_69, Saftant\_72, Speedwell\_71, Urza\_73, Vanseggelen\_74, Verabelle\_71, Verse\_69, VieEnRose\_72, Yosif\_71, phiCAM\_65, phiHau3\_67,

### Summary by start number:

#### Start 15:

- Found in 4 of 105 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 2 of 99
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Urza\_73 (BD6), VieEnRose\_72 (BD6),

#### Start 17:

- Found in 13 of 105 ( 12.4% ) of genes in pham
- Manual Annotations of this start: 2 of 99
- Called 15.4% of time when present
- Phage (with cluster) where this start called: Danzina\_74 (BD1), Sujidade\_74 (BD1),

#### Start 18:

- Found in 7 of 105 ( 6.7% ) of genes in pham
- Manual Annotations of this start: 4 of 99
- Called 57.1% of time when present
- Phage (with cluster) where this start called: BroPlease\_65 (BD4), Celia\_71 (BD6), GreenWeasel\_67 (BD4), phiHau3\_67 (BD4),

#### Start 19:

- Found in 29 of 105 ( 27.6% ) of genes in pham
- Manual Annotations of this start: 1 of 99
- Called 3.4% of time when present
- Phage (with cluster) where this start called: Zemlya\_74 (BD1),

#### Start 20:

- Found in 9 of 105 ( 8.6% ) of genes in pham
- Manual Annotations of this start: 4 of 99
- Called 44.4% of time when present
- Phage (with cluster) where this start called: Alsaber\_74 (BD3), Conan\_75 (BD3), Pavo\_75 (BD3), Provolone\_75 (BD3),

#### Start 22:

- Found in 1 of 105 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 99
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Speedwell\_71 (BD3),

#### Start 23:

- Found in 14 of 105 ( 13.3% ) of genes in pham
- Manual Annotations of this start: 6 of 99
- Called 71.4% of time when present
- Phage (with cluster) where this start called: Amela\_68 (BD3), Celery\_73 (BD3), Dexers\_72 (BD3), ElGato\_75 (BD3), Kaine\_74 (BD3), Saftant\_72 (BD3), Vanseggelen\_74 (BD3), Verabelle\_71 (BD3), Verse\_69 (BD3), phiCAM\_65 (BD3),

Start 24:

- Found in 4 of 105 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 1 of 99
- Called 25.0% of time when present
- Phage (with cluster) where this start called: Itza\_74 (BD6),

Start 25:

- Found in 78 of 105 ( 74.3% ) of genes in pham
- Manual Annotations of this start: 73 of 99
- Called 96.2% of time when present
- Phage (with cluster) where this start called: Aaronocolus\_71 (BD1), Alvy\_71 (BD2), Andris\_67 (BD2), Animus\_66 (BD2), Asten\_71 (BD1), Axiom\_73 (BD2), BarryBee\_74 (BD1), BartholomewSD\_71 (BD2), BeardedLady\_72 (BD1), Bovely\_71 (BD1), Bowden\_67 (BD2), Brataylor\_75 (BD1), BryanRecycles\_73 (BD1), Caelum\_70 (BD2), Caliburn\_70 (BD1), Celeste\_74 (BD1), Chucky\_71 (BD1), Dattran\_75 (BD1), Dwayne\_71 (BD1), Eddasa\_74 (BD1), Ejemplo\_69 (BD1), Emaanora\_74 (BD1), EnochSoames\_75 (BD1), Esperer\_72 (BD1), GirlDinner\_66 (BD2), Goby\_74 (BD1), Godpower\_74 (BD1), Hank144\_69 (BD2), Hippo\_71 (BD1), Hydra\_74 (BD1), Indigo\_70 (BD1), Issmi\_68 (BD2), Izzy\_73 (BD1), Janus\_67 (BD2), Jash\_73 (BD1), Jevington\_68 (BD2), Katalie\_70 (BD1), Lannister\_71 (BD1), Legacy\_71 (BD1), Leviticus\_72 (BD1), Lika\_73 (BD1), Lorelei\_73 (BD1), Maneekul\_71 (BD1), Marav\_68 (BD2), Nabi\_74 (BD1), Nanodon\_73 (BD1), Nerdos\_70 (BD1), Oliynyk\_73 (BD1), Ozzie\_71 (BD1), OzzyJ\_73 (BD1), Pablito\_66 (BD2), Paolo\_71 (BD2), Phettuccine\_71 (BD1), Puginator\_71 (BD2), Rana\_74 (BD1), RedBear\_71 (BD1), Rusticus\_73 (BD1), SarahRose\_71 (BD1), Snorlax\_71 (BD1), South40\_70 (BD1), SqueakyClean\_67 (BD2), SunsetPointe\_71 (BD1), TagePhighter\_73 (BD1), Thestral\_69 (BD2), TinaBelcher\_67 (BD2), Toma\_74 (BD1), Triste\_72 (BD1), Triumph\_69 (BD2), TrvxScott\_66 (BD2), TuanPN\_69 (BD1), Unstoppable\_71 (BD1), Werner\_71 (BD1), Whatever\_71 (BD1), Yasdnil\_71 (BD1), Zainub\_71 (BD2),

Start 26:

- Found in 1 of 105 ( 1.0% ) of genes in pham
- Manual Annotations of this start: 1 of 99
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Yosif\_71 (BD3),

Start 28:

- Found in 4 of 105 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 4 of 99
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ELB20\_68 (BD2), Loofah\_72 (BD2), Paedore\_71 (BD2), R4\_69 (BD2),

**Summary by clusters:**

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

Info for manual annotations of cluster BD1:

- Start number 17 was manually annotated 2 times for cluster BD1.
- Start number 19 was manually annotated 1 time for cluster BD1.
- Start number 25 was manually annotated 52 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 25 was manually annotated 21 times for cluster BD2.
- Start number 28 was manually annotated 4 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 20 was manually annotated 4 times for cluster BD3.
- Start number 22 was manually annotated 1 time for cluster BD3.
- Start number 23 was manually annotated 6 times for cluster BD3.
- Start number 26 was manually annotated 1 time for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 18 was manually annotated 3 times for cluster BD4.

Info for manual annotations of cluster BD6:

- Start number 15 was manually annotated 2 times for cluster BD6.
- Start number 18 was manually annotated 1 time for cluster BD6.
- Start number 24 was manually annotated 1 time for cluster BD6.

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

Gene: Aaronocolus\_71 Start: 47892, Stop: 47467, Start Num: 25

Candidate Starts for Aaronocolus\_71:

(Start: 25 @47892 has 73 MA's), (43, 47832), (59, 47778), (66, 47769), (79, 47643), (88, 47553), (89, 47550),

Gene: Alsaber\_74 Start: 47086, Stop: 46583, Start Num: 20

Candidate Starts for Alsaber\_74:

(4, 47242), (10, 47179), (12, 47164), (Start: 20 @47086 has 4 MA's), (Start: 23 @47065 has 6 MA's), (40, 47002), (46, 46966), (62, 46894), (75, 46801), (81, 46747), (93, 46618),

Gene: Alvy\_71 Start: 46255, Stop: 45833, Start Num: 25

Candidate Starts for Alvy\_71:

(Start: 25 @46255 has 73 MA's), (39, 46210), (41, 46204), (56, 46156), (79, 46009),

Gene: Amela\_68 Start: 45690, Stop: 45211, Start Num: 23

Candidate Starts for Amela\_68:

(Start: 23 @45690 has 6 MA's), (41, 45624), (49, 45579), (63, 45519), (80, 45384),

Gene: Andris\_67 Start: 44165, Stop: 43704, Start Num: 25

Candidate Starts for Andris\_67:

(Start: 25 @44165 has 73 MA's), (63, 44018), (65, 44012), (76, 43898), (88, 43790),

Gene: Animus\_66 Start: 45219, Stop: 44758, Start Num: 25

Candidate Starts for Animus\_66:

(Start: 25 @45219 has 73 MA's), (40, 45174), (56, 45099), (63, 45072), (65, 45066), (76, 44952), (88, 44844),

Gene: Asten\_71 Start: 50036, Stop: 49608, Start Num: 25

Candidate Starts for Asten\_71:

(7, 50174), (Start: 19 @50084 has 1 MA's), (Start: 25 @50036 has 73 MA's), (32, 50012), (43, 49976), (85, 49733), (86, 49724),

Gene: Axiom\_73 Start: 44914, Stop: 44447, Start Num: 25

Candidate Starts for Axiom\_73:

(9, 45043), (Start: 25 @44914 has 73 MA's), (53, 44803), (63, 44761), (65, 44755), (88, 44533), (89, 44530),

Gene: BarryBee\_74 Start: 50009, Stop: 49581, Start Num: 25

Candidate Starts for BarryBee\_74:

(7, 50147), (Start: 19 @50057 has 1 MA's), (Start: 25 @50009 has 73 MA's), (32, 49985), (43, 49949), (85, 49706), (86, 49697),

Gene: BartholomewSD\_71 Start: 45374, Stop: 44952, Start Num: 25

Candidate Starts for BartholomewSD\_71:

(Start: 25 @45374 has 73 MA's), (39, 45329), (41, 45323), (56, 45275), (79, 45128),

Gene: BeardedLady\_72 Start: 48272, Stop: 47847, Start Num: 25

Candidate Starts for BeardedLady\_72:

(Start: 25 @48272 has 73 MA's), (43, 48212), (59, 48158), (66, 48149), (79, 48023), (88, 47933), (89, 47930),

Gene: Bovely\_71 Start: 47895, Stop: 47470, Start Num: 25

Candidate Starts for Bovely\_71:

(Start: 25 @47895 has 73 MA's), (43, 47835), (59, 47781), (66, 47772), (79, 47646), (88, 47556), (89, 47553),

Gene: Bowden\_67 Start: 45935, Stop: 45486, Start Num: 25

Candidate Starts for Bowden\_67:

(Start: 25 @45935 has 73 MA's), (30, 45917), (53, 45836), (56, 45827), (63, 45800), (65, 45794), (79, 45662), (82, 45632), (87, 45596), (88, 45572),

Gene: Brataylor\_75 Start: 49554, Stop: 49126, Start Num: 25

Candidate Starts for Brataylor\_75:

(11, 49674), (Start: 17 @49611 has 2 MA's), (Start: 19 @49602 has 1 MA's), (Start: 25 @49554 has 73 MA's), (32, 49530), (43, 49494), (83, 49269), (88, 49212), (89, 49209),

Gene: BroPlease\_65 Start: 43699, Stop: 43223, Start Num: 18

Candidate Starts for BroPlease\_65:

(3, 43876), (5, 43837), (Start: 18 @43699 has 4 MA's), (29, 43633), (37, 43609), (60, 43528), (70, 43465), (79, 43399),

Gene: BryanRecycles\_73 Start: 48398, Stop: 47973, Start Num: 25

Candidate Starts for BryanRecycles\_73:

(Start: 25 @48398 has 73 MA's), (43, 48338), (59, 48284), (66, 48275), (79, 48149), (88, 48059), (89, 48056),

Gene: Caelum\_70 Start: 44242, Stop: 43811, Start Num: 25

Candidate Starts for Caelum\_70:

(Start: 25 @44242 has 73 MA's), (56, 44143), (63, 44125), (67, 44110), (79, 43987),

Gene: Caliburn\_70 Start: 48280, Stop: 47855, Start Num: 25

Candidate Starts for Caliburn\_70:

(Start: 25 @48280 has 73 MA's), (43, 48220), (59, 48166), (66, 48157), (79, 48031), (88, 47941), (89, 47938),



Gene: Celery\_73 Start: 44746, Stop: 44285, Start Num: 23

Candidate Starts for Celery\_73:

(Start: 23 @44746 has 6 MA's), (46, 44656), (51, 44632), (63, 44593), (79, 44461), (80, 44458),

Gene: Celeste\_74 Start: 49022, Stop: 48594, Start Num: 25

Candidate Starts for Celeste\_74:

(11, 49142), (Start: 17 @49079 has 2 MA's), (Start: 19 @49070 has 1 MA's), (Start: 25 @49022 has 73 MA's), (32, 48998), (43, 48962), (83, 48737), (88, 48680), (89, 48677),

Gene: Celia\_71 Start: 46426, Stop: 45908, Start Num: 18

Candidate Starts for Celia\_71:

(Start: 15 @46462 has 2 MA's), (Start: 18 @46426 has 4 MA's), (21, 46408), (Start: 24 @46378 has 1 MA's), (29, 46360), (31, 46354), (33, 46348), (36, 46339), (40, 46327), (69, 46177), (71, 46156), (72, 46153), (73, 46150), (78, 46093), (84, 46045), (94, 45940),

Gene: Chucky\_71 Start: 50071, Stop: 49643, Start Num: 25

Candidate Starts for Chucky\_71:

(7, 50209), (Start: 19 @50119 has 1 MA's), (Start: 25 @50071 has 73 MA's), (32, 50047), (38, 50029), (43, 50011), (85, 49768), (86, 49759),

Gene: Conan\_75 Start: 47338, Stop: 46835, Start Num: 20

Candidate Starts for Conan\_75:

(4, 47494), (6, 47449), (10, 47431), (12, 47416), (Start: 20 @47338 has 4 MA's), (Start: 23 @47317 has 6 MA's), (40, 47254), (46, 47218), (62, 47146), (75, 47053), (81, 46999), (93, 46870),

Gene: Danzina\_74 Start: 49317, Stop: 48832, Start Num: 17

Candidate Starts for Danzina\_74:

(11, 49380), (Start: 17 @49317 has 2 MA's), (Start: 19 @49308 has 1 MA's), (Start: 25 @49260 has 73 MA's), (32, 49236), (43, 49200), (74, 49056), (83, 48975), (88, 48918), (89, 48915),

Gene: Dattran\_75 Start: 49475, Stop: 49047, Start Num: 25

Candidate Starts for Dattran\_75:

(Start: 17 @49532 has 2 MA's), (Start: 19 @49523 has 1 MA's), (Start: 25 @49475 has 73 MA's), (32, 49451), (43, 49415), (83, 49190), (88, 49133), (89, 49130),

Gene: Dexers\_72 Start: 47283, Stop: 46801, Start Num: 23

Candidate Starts for Dexers\_72:

(4, 47460), (6, 47415), (10, 47397), (12, 47382), (Start: 20 @47304 has 4 MA's), (Start: 23 @47283 has 6 MA's), (40, 47220), (46, 47184), (56, 47142), (62, 47112), (75, 47019), (81, 46965), (93, 46836),

Gene: Dwayne\_71 Start: 50059, Stop: 49631, Start Num: 25

Candidate Starts for Dwayne\_71:

(7, 50197), (Start: 19 @50107 has 1 MA's), (Start: 25 @50059 has 73 MA's), (32, 50035), (43, 49999), (85, 49756), (86, 49747),

Gene: ELB20\_68 Start: 44653, Stop: 44234, Start Num: 28

Candidate Starts for ELB20\_68:

(Start: 28 @44653 has 4 MA's), (39, 44620), (56, 44560), (59, 44554), (76, 44428), (79, 44410),

Gene: Eddasa\_74 Start: 48937, Stop: 48512, Start Num: 25

Candidate Starts for Eddasa\_74:

(Start: 25 @48937 has 73 MA's), (43, 48877), (59, 48823), (66, 48814), (79, 48688), (88, 48598), (89, 48595),

Gene: Ejemplo\_69 Start: 49997, Stop: 49569, Start Num: 25

Candidate Starts for Ejemplo\_69:

(7, 50135), (Start: 19 @50045 has 1 MA's), (Start: 25 @49997 has 73 MA's), (32, 49973), (43, 49937), (85, 49694), (86, 49685),

Gene: ElGato\_75 Start: 47177, Stop: 46695, Start Num: 23

Candidate Starts for ElGato\_75:

(10, 47291), (12, 47276), (Start: 20 @47198 has 4 MA's), (Start: 23 @47177 has 6 MA's), (40, 47114), (62, 47006), (75, 46913), (81, 46859), (93, 46730),

Gene: Emaanora\_74 Start: 49983, Stop: 49555, Start Num: 25

Candidate Starts for Emaanora\_74:

(7, 50121), (Start: 19 @50031 has 1 MA's), (Start: 25 @49983 has 73 MA's), (32, 49959), (38, 49941), (43, 49923), (85, 49680), (86, 49671),

Gene: EnochSoames\_75 Start: 48104, Stop: 47679, Start Num: 25

Candidate Starts for EnochSoames\_75:

(Start: 25 @48104 has 73 MA's), (43, 48044), (59, 47990), (66, 47981), (76, 47873), (88, 47765), (89, 47762),

Gene: Esperer\_72 Start: 48238, Stop: 47813, Start Num: 25

Candidate Starts for Esperer\_72:

(Start: 25 @48238 has 73 MA's), (43, 48178), (59, 48124), (66, 48115), (79, 47989), (88, 47899), (89, 47896),

Gene: GirlDinner\_66 Start: 44711, Stop: 44250, Start Num: 25

Candidate Starts for GirlDinner\_66:

(Start: 25 @44711 has 73 MA's), (40, 44666), (56, 44591), (63, 44564), (65, 44558), (76, 44444), (88, 44336),

Gene: Goby\_74 Start: 49892, Stop: 49464, Start Num: 25

Candidate Starts for Goby\_74:

(Start: 17 @49949 has 2 MA's), (Start: 19 @49940 has 1 MA's), (Start: 25 @49892 has 73 MA's), (32, 49868), (43, 49832), (83, 49607), (88, 49550), (89, 49547),

Gene: Godpower\_74 Start: 49186, Stop: 48758, Start Num: 25

Candidate Starts for Godpower\_74:

(Start: 17 @49243 has 2 MA's), (Start: 19 @49234 has 1 MA's), (Start: 25 @49186 has 73 MA's), (32, 49162), (43, 49126), (74, 48982), (83, 48901), (88, 48844), (89, 48841),

Gene: GreenWeasel\_67 Start: 43704, Stop: 43228, Start Num: 18

Candidate Starts for GreenWeasel\_67:

(5, 43842), (Start: 18 @43704 has 4 MA's), (29, 43638), (37, 43614), (60, 43533), (70, 43470), (79, 43404),

Gene: Hank144\_69 Start: 44919, Stop: 44458, Start Num: 25

Candidate Starts for Hank144\_69:

(Start: 25 @44919 has 73 MA's), (34, 44892), (53, 44814), (65, 44766), (76, 44652), (79, 44634), (89, 44541),

Gene: Hippo\_71 Start: 50045, Stop: 49617, Start Num: 25  
Candidate Starts for Hippo\_71:  
(7, 50183), (Start: 19 @50093 has 1 MA's), (Start: 25 @50045 has 73 MA's), (32, 50021), (43, 49985),  
(85, 49742), (86, 49733),

Gene: Hydra\_74 Start: 49052, Stop: 48627, Start Num: 25  
Candidate Starts for Hydra\_74:  
(Start: 25 @49052 has 73 MA's), (43, 48992), (59, 48938), (66, 48929), (79, 48803), (88, 48713), (89,  
48710),

Gene: Indigo\_70 Start: 47888, Stop: 47463, Start Num: 25  
Candidate Starts for Indigo\_70:  
(Start: 25 @47888 has 73 MA's), (43, 47828), (59, 47774), (66, 47765), (79, 47639), (88, 47549), (89,  
47546),

Gene: Issmi\_68 Start: 44876, Stop: 44448, Start Num: 25  
Candidate Starts for Issmi\_68:  
(Start: 25 @44876 has 73 MA's), (56, 44777), (63, 44759), (67, 44744), (79, 44624), (93, 44483),

Gene: Itza\_74 Start: 46311, Stop: 45841, Start Num: 24  
Candidate Starts for Itza\_74:  
(Start: 15 @46395 has 2 MA's), (Start: 18 @46359 has 4 MA's), (21, 46341), (Start: 24 @46311 has 1  
MA's), (29, 46293), (31, 46287), (33, 46281), (36, 46272), (40, 46260), (69, 46110), (71, 46089), (72,  
46086), (73, 46083), (78, 46026), (84, 45978), (94, 45873),

Gene: Izzy\_73 Start: 48445, Stop: 48020, Start Num: 25  
Candidate Starts for Izzy\_73:  
(Start: 25 @48445 has 73 MA's), (43, 48385), (59, 48331), (66, 48322), (79, 48196), (88, 48106), (89,  
48103),

Gene: Janus\_67 Start: 45051, Stop: 44590, Start Num: 25  
Candidate Starts for Janus\_67:  
(Start: 25 @45051 has 73 MA's), (40, 45006), (56, 44931), (63, 44904), (65, 44898), (76, 44784), (88,  
44676),

Gene: Jash\_73 Start: 48398, Stop: 47973, Start Num: 25  
Candidate Starts for Jash\_73:  
(Start: 25 @48398 has 73 MA's), (43, 48338), (59, 48284), (66, 48275), (79, 48149), (88, 48059), (89,  
48056),

Gene: Jevington\_68 Start: 43253, Stop: 42822, Start Num: 25  
Candidate Starts for Jevington\_68:  
(Start: 25 @43253 has 73 MA's), (34, 43223), (76, 43016), (79, 42998), (89, 42905),

Gene: Kaine\_74 Start: 47089, Stop: 46607, Start Num: 23  
Candidate Starts for Kaine\_74:  
(4, 47266), (6, 47221), (10, 47203), (12, 47188), (Start: 20 @47110 has 4 MA's), (Start: 23 @47089  
has 6 MA's), (40, 47026), (46, 46990), (56, 46948), (62, 46918), (75, 46825), (81, 46771), (93, 46642),

Gene: Katalie\_70 Start: 49765, Stop: 49337, Start Num: 25  
Candidate Starts for Katalie\_70:  
(Start: 25 @49765 has 73 MA's), (32, 49741), (43, 49705), (92, 49390),

Gene: Lannister\_71 Start: 48622, Stop: 48200, Start Num: 25

Candidate Starts for Lannister\_71:

(Start: 25 @48622 has 73 MA's), (43, 48562), (61, 48505), (79, 48376), (88, 48286), (89, 48283),

Gene: Legacy\_71 Start: 48271, Stop: 47846, Start Num: 25

Candidate Starts for Legacy\_71:

(Start: 25 @48271 has 73 MA's), (43, 48211), (59, 48157), (66, 48148), (79, 48022), (88, 47932), (89, 47929),

Gene: Leviticus\_72 Start: 48425, Stop: 48000, Start Num: 25

Candidate Starts for Leviticus\_72:

(Start: 25 @48425 has 73 MA's), (43, 48365), (59, 48311), (66, 48302), (79, 48176), (88, 48086), (89, 48083),

Gene: Lika\_73 Start: 49739, Stop: 49311, Start Num: 25

Candidate Starts for Lika\_73:

(Start: 17 @49796 has 2 MA's), (Start: 19 @49787 has 1 MA's), (Start: 25 @49739 has 73 MA's), (32, 49715), (43, 49679), (74, 49535), (83, 49454), (88, 49397), (89, 49394),

Gene: Loofah\_72 Start: 45637, Stop: 45218, Start Num: 28

Candidate Starts for Loofah\_72:

(Start: 28 @45637 has 4 MA's), (39, 45604), (56, 45544), (76, 45412), (79, 45394),

Gene: Lorelei\_73 Start: 49033, Stop: 48599, Start Num: 25

Candidate Starts for Lorelei\_73:

(11, 49153), (Start: 17 @49090 has 2 MA's), (Start: 19 @49081 has 1 MA's), (Start: 25 @49033 has 73 MA's), (32, 49009), (35, 49000), (43, 48973), (67, 48895), (74, 48823), (77, 48787), (83, 48742), (88, 48685), (89, 48682),

Gene: Maneekul\_71 Start: 50076, Stop: 49648, Start Num: 25

Candidate Starts for Maneekul\_71:

(7, 50214), (Start: 25 @50076 has 73 MA's), (32, 50052), (43, 50016), (85, 49773), (86, 49764),

Gene: Marav\_68 Start: 43240, Stop: 42809, Start Num: 25

Candidate Starts for Marav\_68:

(Start: 25 @43240 has 73 MA's), (34, 43210), (42, 43186), (56, 43132), (79, 42985),

Gene: Nabi\_74 Start: 49602, Stop: 49168, Start Num: 25

Candidate Starts for Nabi\_74:

(11, 49722), (Start: 17 @49659 has 2 MA's), (Start: 19 @49650 has 1 MA's), (Start: 25 @49602 has 73 MA's), (32, 49578), (35, 49569), (43, 49542), (67, 49464), (74, 49392), (77, 49356), (83, 49311), (88, 49254), (89, 49251),

Gene: Nanodon\_73 Start: 48586, Stop: 48134, Start Num: 25

Candidate Starts for Nanodon\_73:

(Start: 25 @48586 has 73 MA's), (32, 48562), (35, 48553), (43, 48526), (66, 48439), (68, 48430), (79, 48310), (90, 48202),

Gene: Nerdos\_70 Start: 47887, Stop: 47462, Start Num: 25

Candidate Starts for Nerdos\_70:

(Start: 25 @47887 has 73 MA's), (43, 47827), (59, 47773), (66, 47764), (79, 47638), (88, 47548), (89, 47545),

Gene: Oliynyk\_73 Start: 48307, Stop: 47882, Start Num: 25

Candidate Starts for Oliynyk\_73:

(Start: 25 @48307 has 73 MA's), (43, 48247), (59, 48193), (66, 48184), (79, 48058), (88, 47968), (89, 47965),

Gene: Ozzie\_71 Start: 48280, Stop: 47855, Start Num: 25

Candidate Starts for Ozzie\_71:

(Start: 25 @48280 has 73 MA's), (43, 48220), (59, 48166), (66, 48157), (79, 48031), (88, 47941), (89, 47938),

Gene: OzzyJ\_73 Start: 49963, Stop: 49535, Start Num: 25

Candidate Starts for OzzyJ\_73:

(2, 50251), (11, 50080), (Start: 19 @50011 has 1 MA's), (Start: 25 @49963 has 73 MA's), (32, 49939), (43, 49903), (74, 49759), (85, 49660),

Gene: Pablito\_66 Start: 43502, Stop: 43080, Start Num: 25

Candidate Starts for Pablito\_66:

(Start: 25 @43502 has 73 MA's), (74, 43304), (79, 43256), (88, 43166), (89, 43163),

Gene: Paedore\_71 Start: 46003, Stop: 45584, Start Num: 28

Candidate Starts for Paedore\_71:

(Start: 28 @46003 has 4 MA's), (39, 45970), (56, 45910), (59, 45904), (76, 45778), (79, 45760),

Gene: Paolo\_71 Start: 44940, Stop: 44509, Start Num: 25

Candidate Starts for Paolo\_71:

(Start: 25 @44940 has 73 MA's), (34, 44910), (42, 44886), (79, 44685), (89, 44592),

Gene: Pavo\_75 Start: 47286, Stop: 46783, Start Num: 20

Candidate Starts for Pavo\_75:

(1, 47556), (4, 47442), (6, 47397), (10, 47379), (12, 47364), (Start: 20 @47286 has 4 MA's), (Start: 23 @47265 has 6 MA's), (40, 47202), (46, 47166), (62, 47094), (75, 47001), (81, 46947), (93, 46818),

Gene: Phettuccine\_71 Start: 47858, Stop: 47433, Start Num: 25

Candidate Starts for Phettuccine\_71:

(Start: 25 @47858 has 73 MA's), (43, 47798), (59, 47744), (66, 47735), (79, 47609), (88, 47519), (89, 47516),

Gene: Provolone\_75 Start: 47427, Stop: 46924, Start Num: 20

Candidate Starts for Provolone\_75:

(1, 47697), (4, 47583), (10, 47520), (12, 47505), (Start: 20 @47427 has 4 MA's), (Start: 23 @47406 has 6 MA's), (40, 47343), (46, 47307), (62, 47235), (75, 47142), (81, 47088), (93, 46959),

Gene: Puginator\_71 Start: 44987, Stop: 44556, Start Num: 25

Candidate Starts for Puginator\_71:

(8, 45119), (Start: 25 @44987 has 73 MA's), (34, 44957), (56, 44879), (79, 44732),

Gene: R4\_69 Start: 44813, Stop: 44394, Start Num: 28

Candidate Starts for R4\_69:

(Start: 28 @44813 has 4 MA's), (39, 44780), (56, 44720), (59, 44714), (76, 44588), (79, 44570),

Gene: Rana\_74 Start: 49455, Stop: 49021, Start Num: 25

Candidate Starts for Rana\_74:

(11, 49575), (Start: 17 @49512 has 2 MA's), (Start: 19 @49503 has 1 MA's), (Start: 25 @49455 has 73 MA's), (32, 49431), (35, 49422), (43, 49395), (67, 49317), (74, 49245), (77, 49209), (83, 49164), (88, 49107), (89, 49104),

Gene: RedBear\_71 Start: 49765, Stop: 49337, Start Num: 25

Candidate Starts for RedBear\_71:

(Start: 25 @49765 has 73 MA's), (32, 49741), (43, 49705), (92, 49390),

Gene: Rusticus\_73 Start: 48398, Stop: 47973, Start Num: 25

Candidate Starts for Rusticus\_73:

(Start: 25 @48398 has 73 MA's), (43, 48338), (59, 48284), (66, 48275), (79, 48149), (88, 48059), (89, 48056),

Gene: Saftant\_72 Start: 47099, Stop: 46659, Start Num: 23

Candidate Starts for Saftant\_72:

(1, 47390), (4, 47276), (6, 47231), (12, 47198), (Start: 20 @47120 has 4 MA's), (Start: 23 @47099 has 6 MA's), (44, 47027), (50, 46994), (52, 46988), (55, 46979), (67, 46937), (79, 46835), (93, 46694),

Gene: SarahRose\_71 Start: 50046, Stop: 49618, Start Num: 25

Candidate Starts for SarahRose\_71:

(7, 50184), (Start: 19 @50094 has 1 MA's), (Start: 25 @50046 has 73 MA's), (32, 50022), (38, 50004), (43, 49986), (85, 49743), (86, 49734),

Gene: Snorlax\_71 Start: 50071, Stop: 49643, Start Num: 25

Candidate Starts for Snorlax\_71:

(7, 50209), (Start: 19 @50119 has 1 MA's), (Start: 25 @50071 has 73 MA's), (32, 50047), (38, 50029), (43, 50011), (85, 49768), (86, 49759),

Gene: South40\_70 Start: 49765, Stop: 49337, Start Num: 25

Candidate Starts for South40\_70:

(Start: 25 @49765 has 73 MA's), (32, 49741), (43, 49705), (92, 49390),

Gene: Speedwell\_71 Start: 45822, Stop: 45367, Start Num: 22

Candidate Starts for Speedwell\_71:

(13, 45906), (14, 45894), (Start: 20 @45840 has 4 MA's), (Start: 22 @45822 has 1 MA's), (27, 45795), (50, 45720), (52, 45714), (64, 45669), (66, 45663), (67, 45657), (79, 45543), (91, 45423), (93, 45402),

Gene: SqueakyClean\_67 Start: 45229, Stop: 44768, Start Num: 25

Candidate Starts for SqueakyClean\_67:

(Start: 25 @45229 has 73 MA's), (40, 45184), (56, 45109), (63, 45082), (65, 45076), (76, 44962), (88, 44854),

Gene: Sujidade\_74 Start: 50093, Stop: 49608, Start Num: 17

Candidate Starts for Sujidade\_74:

(11, 50153), (Start: 17 @50093 has 2 MA's), (Start: 19 @50084 has 1 MA's), (Start: 25 @50036 has 73 MA's), (32, 50012), (43, 49976), (74, 49832), (83, 49751), (88, 49694), (89, 49691),

Gene: SunsetPointe\_71 Start: 48287, Stop: 47862, Start Num: 25

Candidate Starts for SunsetPointe\_71:

(Start: 25 @48287 has 73 MA's), (43, 48227), (59, 48173), (66, 48164), (79, 48038), (88, 47948), (89, 47945),

Gene: TagePighter\_73 Start: 50046, Stop: 49618, Start Num: 25

Candidate Starts for TagePhighter\_73:

(7, 50184), (Start: 19 @50094 has 1 MA's), (Start: 25 @50046 has 73 MA's), (32, 50022), (38, 50004), (43, 49986), (85, 49743), (86, 49734),

Gene: Thestral\_69 Start: 45962, Stop: 45513, Start Num: 25

Candidate Starts for Thestral\_69:

(Start: 25 @45962 has 73 MA's), (30, 45944), (53, 45863), (56, 45854), (63, 45827), (65, 45821), (88, 45599),

Gene: TinaBelcher\_67 Start: 45824, Stop: 45375, Start Num: 25

Candidate Starts for TinaBelcher\_67:

(Start: 25 @45824 has 73 MA's), (30, 45806), (53, 45725), (56, 45716), (63, 45689), (65, 45683), (79, 45551), (82, 45521), (87, 45485), (88, 45461),

Gene: Toma\_74 Start: 49895, Stop: 49467, Start Num: 25

Candidate Starts for Toma\_74:

(Start: 17 @49952 has 2 MA's), (Start: 19 @49943 has 1 MA's), (Start: 25 @49895 has 73 MA's), (32, 49871), (43, 49835), (83, 49610), (88, 49553), (89, 49550),

Gene: Triste\_72 Start: 50045, Stop: 49617, Start Num: 25

Candidate Starts for Triste\_72:

(7, 50183), (Start: 19 @50093 has 1 MA's), (Start: 25 @50045 has 73 MA's), (32, 50021), (38, 50003), (43, 49985), (85, 49742), (86, 49733),

Gene: Triumph\_69 Start: 44652, Stop: 44185, Start Num: 25

Candidate Starts for Triumph\_69:

(Start: 25 @44652 has 73 MA's), (53, 44541), (63, 44499), (65, 44493), (88, 44271), (89, 44268),

Gene: TrvxScott\_66 Start: 45929, Stop: 45480, Start Num: 25

Candidate Starts for TrvxScott\_66:

(Start: 25 @45929 has 73 MA's), (30, 45911), (53, 45830), (56, 45821), (63, 45794), (65, 45788), (79, 45656), (82, 45626), (87, 45590), (88, 45566),

Gene: TuanPN\_69 Start: 49997, Stop: 49569, Start Num: 25

Candidate Starts for TuanPN\_69:

(7, 50135), (Start: 19 @50045 has 1 MA's), (Start: 25 @49997 has 73 MA's), (32, 49973), (43, 49937), (85, 49694), (86, 49685),

Gene: Unstoppable\_71 Start: 47886, Stop: 47461, Start Num: 25

Candidate Starts for Unstoppable\_71:

(Start: 25 @47886 has 73 MA's), (43, 47826), (59, 47772), (66, 47763), (79, 47637), (88, 47547), (89, 47544),

Gene: Urza\_73 Start: 46416, Stop: 45862, Start Num: 15

Candidate Starts for Urza\_73:

(Start: 15 @46416 has 2 MA's), (Start: 18 @46380 has 4 MA's), (21, 46362), (Start: 24 @46332 has 1 MA's), (29, 46314), (31, 46308), (33, 46302), (36, 46293), (40, 46281), (69, 46131), (71, 46110), (72, 46107), (73, 46104), (78, 46047), (84, 45999), (94, 45894),

Gene: Vanseggelen\_74 Start: 44923, Stop: 44450, Start Num: 23

Candidate Starts for Vanseggelen\_74:

(Start: 23 @44923 has 6 MA's), (48, 44821), (50, 44815), (58, 44773), (64, 44755), (79, 44626),

Gene: Verabelle\_71 Start: 44363, Stop: 43890, Start Num: 23  
Candidate Starts for Verabelle\_71:  
(Start: 23 @44363 has 6 MA's), (48, 44261), (54, 44237), (58, 44213), (76, 44084), (78, 44069),

Gene: Verse\_69 Start: 45681, Stop: 45202, Start Num: 23  
Candidate Starts for Verse\_69:  
(Start: 23 @45681 has 6 MA's), (41, 45615), (49, 45570), (63, 45510), (79, 45378),

Gene: VieEnRose\_72 Start: 46184, Stop: 45630, Start Num: 15  
Candidate Starts for VieEnRose\_72:  
(Start: 15 @46184 has 2 MA's), (16, 46169), (Start: 18 @46148 has 4 MA's), (21, 46130), (Start: 24 @46100 has 1 MA's), (29, 46082), (31, 46076), (33, 46070), (36, 46061), (40, 46049), (71, 45878), (72, 45875), (73, 45872), (78, 45815), (84, 45767), (94, 45662),

Gene: Werner\_71 Start: 50043, Stop: 49615, Start Num: 25  
Candidate Starts for Werner\_71:  
(7, 50181), (Start: 19 @50091 has 1 MA's), (Start: 25 @50043 has 73 MA's), (32, 50019), (38, 50001), (43, 49983), (85, 49740), (86, 49731),

Gene: Whatever\_71 Start: 50068, Stop: 49640, Start Num: 25  
Candidate Starts for Whatever\_71:  
(7, 50206), (Start: 19 @50116 has 1 MA's), (Start: 25 @50068 has 73 MA's), (32, 50044), (38, 50026), (43, 50008), (85, 49765), (86, 49756),

Gene: Yasdni1\_71 Start: 50095, Stop: 49667, Start Num: 25  
Candidate Starts for Yasdni1\_71:  
(7, 50233), (Start: 19 @50143 has 1 MA's), (Start: 25 @50095 has 73 MA's), (32, 50071), (43, 50035), (85, 49792), (86, 49783),

Gene: Yosif\_71 Start: 45888, Stop: 45436, Start Num: 26  
Candidate Starts for Yosif\_71:  
(Start: 26 @45888 has 1 MA's), (45, 45828), (47, 45813),

Gene: Zainub\_71 Start: 44914, Stop: 44483, Start Num: 25  
Candidate Starts for Zainub\_71:  
(Start: 25 @44914 has 73 MA's), (34, 44884), (42, 44860), (79, 44659),

Gene: Zemlya\_74 Start: 49611, Stop: 49135, Start Num: 19  
Candidate Starts for Zemlya\_74:  
(11, 49683), (Start: 17 @49620 has 2 MA's), (Start: 19 @49611 has 1 MA's), (Start: 25 @49563 has 73 MA's), (32, 49539), (43, 49503), (83, 49278), (88, 49221), (89, 49218),

Gene: phiCAM\_65 Start: 46443, Stop: 45970, Start Num: 23  
Candidate Starts for phiCAM\_65:  
(Start: 23 @46443 has 6 MA's), (46, 46353), (57, 46308), (63, 46278), (80, 46143),

Gene: phiHau3\_67 Start: 44132, Stop: 43644, Start Num: 18  
Candidate Starts for phiHau3\_67:  
(3, 44309), (5, 44270), (Start: 18 @44132 has 4 MA's), (29, 44066), (37, 44042), (60, 43961), (79, 43820),