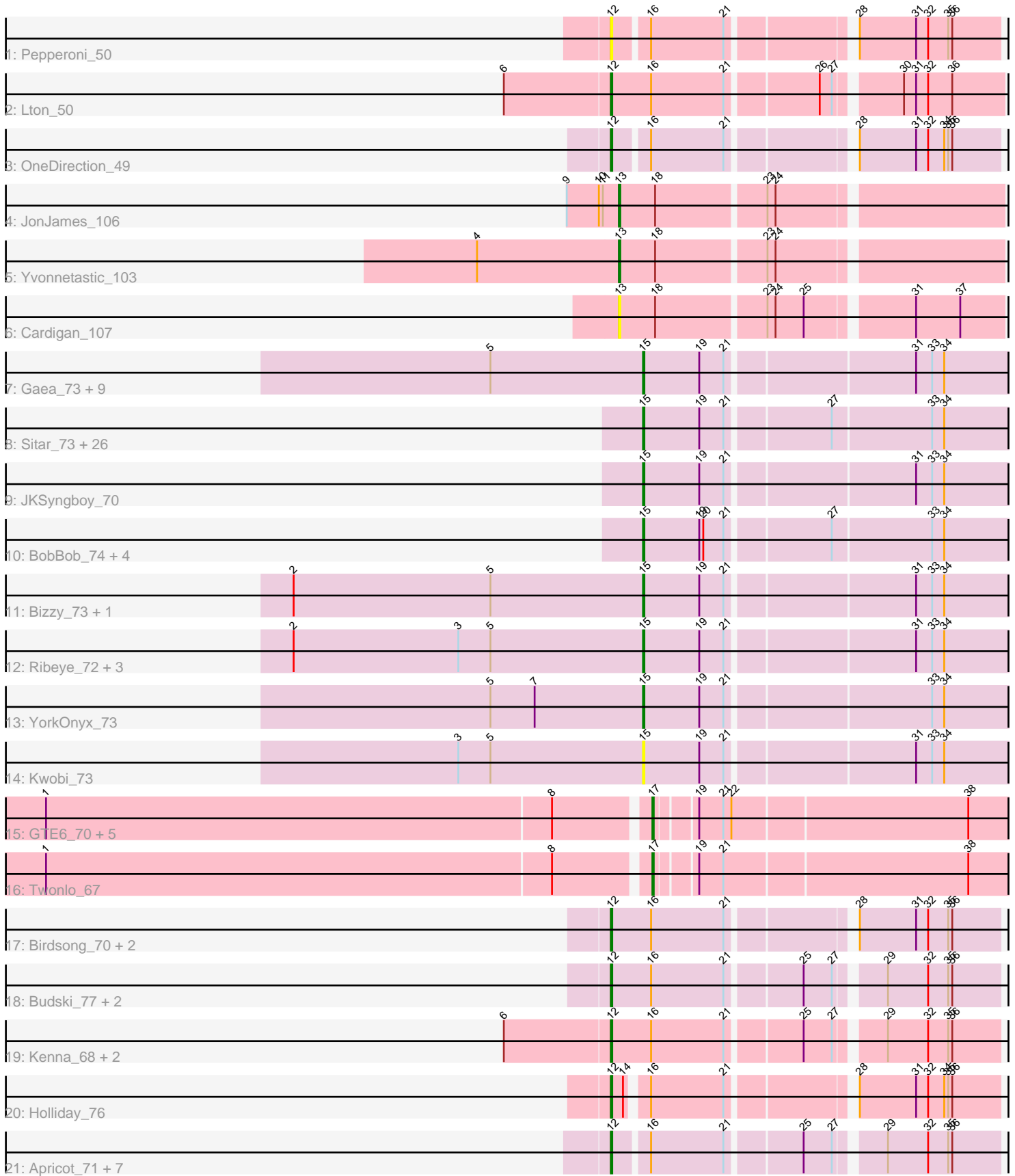


Pham 163548



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 163548 Report

This analysis was run 04/28/24 on database version 559.

Pham number 163548 has 82 members, 15 are drafts.

Phages represented in each track:

- Track 1 : Pepperoni\_50
- Track 2 : Lton\_50
- Track 3 : OneDirection\_49
- Track 4 : JonJames\_106
- Track 5 : Yvonnestic\_103
- Track 6 : Cardigan\_107
- Track 7 : Gaea\_73, Gustavo\_74, StorminNorm\_73, Ashertheman\_72, Baumdotcom\_70, Saronaya\_74, SchottB\_70, Baddon\_70, LilHam\_66, Kroos\_72
- Track 8 : Sitar\_73, Barsten\_74, Kamashten\_72, Nordenberg\_72, Keitabear\_72, Sanjuju\_72, Thing3\_72, MoontowerMania\_73, Brandonk123\_78, Shivanishola\_74, Affeca\_74, Fosterous\_76, Lennon\_73, Angelicage\_72, Ailee\_71, Kewpiedoll\_72, Love\_78, Paries\_75, Fitzgerald\_72, ChadMasterC\_73, Sedona\_72, Jabberwocky\_72, Stultus\_69, Galadriel\_74, Bibwit\_72, McKinley\_75, Geodirt\_72
- Track 9 : JKSyngboy\_70
- Track 10 : BobBob\_74, Charming\_77, Vivi2\_78, Rofo\_74, Tangent\_76
- Track 11 : Bizzy\_73, Tangerine\_73
- Track 12 : Ribeye\_72, Flatwoods\_72, Tycho\_71, Derg\_70
- Track 13 : YorkOnyx\_73
- Track 14 : Kwobi\_73
- Track 15 : GTE6\_70, EdmundFerry\_67, Tiamoceli\_68, Chickadee\_69, Kwekel\_69, RoadKill\_66
- Track 16 : Twonlo\_67
- Track 17 : Birdsong\_70, Frickyeah\_77, Asapag\_71
- Track 18 : Budski\_77, Whitney\_72, Lucky10\_52
- Track 19 : Kenna\_68, Getalong\_74, Lutum\_74
- Track 20 : Holliday\_76
- Track 21 : Apricot\_71, BENtherdunthat\_75, Kamaru\_70, Periwinkle\_81, Crater\_71, Leroy\_71, Phistory\_70, Morkie\_54

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

The start number called the most often in the published annotations is 15, it was called in 42 of the 67 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Affeca\_74, Ailee\_71, Angelicage\_72, Ashertheman\_72, Baddon\_70, Barsten\_74, Baumdotcom\_70, Bibwit\_72, Bizzy\_73, BobBob\_74, Brandonk123\_78, ChadMasterC\_73, Charming\_77, Derg\_70, Fitzgerald\_72, Flatwoods\_72, Fosterous\_76, Gaea\_73, Galadriel\_74, Geodirt\_72, Gustavo\_74, JKSyngboy\_70, Jabberwocky\_72, Kamashten\_72, Keitabear\_72, Kewpiedoll\_72, Kroos\_72, Kwobi\_73, Lennon\_73, LilHam\_66, Love\_78, McKinley\_75, MoontowerMania\_73, Nordenberg\_72, Paries\_75, Ribeye\_72, Rofo\_74, Sanjuju\_72, Saronaya\_74, SchottB\_70, Sedona\_72, Shivanishola\_74, Sitar\_73, StorminNorm\_73, Stultus\_69, Tangent\_76, Tangerine\_73, Thing3\_72, Tycho\_71, Vivi2\_78, YorkOnyx\_73,

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

- 

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

- Apricot\_71, Asapag\_71, BENtherdunthat\_75, Birdsong\_70, Budski\_77, Cardigan\_107, Chickadee\_69, Crater\_71, EdmundFerry\_67, Frickyeah\_77, GTE6\_70, Getalong\_74, Holliday\_76, JonJames\_106, Kamaru\_70, Kenna\_68, Kwekel\_69, Leroy\_71, Lton\_50, Lucky10\_52, Lutum\_74, Morkie\_54, OneDirection\_49, Pepperoni\_50, Periwinkle\_81, Phistory\_70, RoadKill\_66, Tiamoceli\_68, Twonlo\_67, Whitney\_72, Yvonnestic\_103,

### Summary by start number:

Start 12:

- Found in 21 of 82 ( 25.6% ) of genes in pham
- Manual Annotations of this start: 18 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Apricot\_71 (DN3), Asapag\_71 (DN1), BENtherdunthat\_75 (DN1), Birdsong\_70 (DN), Budski\_77 (DN), Crater\_71 (DN3), Frickyeah\_77 (DN1), Getalong\_74 (DN1), Holliday\_76 (DN1), Kamaru\_70 (DN1), Kenna\_68 (DN1), Leroy\_71 (DN1), Lton\_50 (CZ), Lucky10\_52 (DH), Lutum\_74 (DN1), Morkie\_54 (DH), OneDirection\_49 (CZ6), Pepperoni\_50 (CZ), Periwinkle\_81 (DN1), Phistory\_70 (DN1), Whitney\_72 (DN1),

Start 13:

- Found in 3 of 82 ( 3.7% ) of genes in pham
- Manual Annotations of this start: 2 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Cardigan\_107 (DD), JonJames\_106 (DD), Yvonnestic\_103 (DD),

Start 15:

- Found in 51 of 82 ( 62.2% ) of genes in pham
- Manual Annotations of this start: 42 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Affeca\_74 (DE1), Ailee\_71 (DE1), Angelicage\_72 (DE1), Ashertheman\_72 (DE1), Baddon\_70 (DE1), Barsten\_74 (DE1), Baumdotcom\_70 (DE1), Bibwit\_72 (DE1), Bizzy\_73 (DE1), BobBob\_74 (DE1), Brandonk123\_78 (DE1), ChadMasterC\_73 (DE1), Charming\_77 (DE1), Derg\_70 (DE1), Fitzgerald\_72 (DE1), Flatwoods\_72 (DE1), Fosterous\_76 (DE1), Gaea\_73 (DE1), Galadriel\_74 (DE1), Geodirt\_72 (DE1), Gustavo\_74 (DE1), JKSyngboy\_70 (DE1), Jabberwocky\_72 (DE1), Kamashten\_72 (DE1), Keitabear\_72 (DE1),

Kewpiedoll\_72 (DE1), Kroos\_72 (DE1), Kwobi\_73 (DE1), Lennon\_73 (DE1), LilHam\_66 (DE1), Love\_78 (DE1), McKinley\_75 (DE1), MoontowerMania\_73 (DE1), Nordenberg\_72 (DE1), Paries\_75 (DE1), Ribeye\_72 (DE1), Rofo\_74 (DE1), Sanjuju\_72 (DE1), Saronaya\_74 (DE1), SchottB\_70 (DE1), Sedona\_72 (DE1), Shivanishola\_74 (DE1), Sitar\_73 (DE1), StorminNorm\_73 (DE1), Stultus\_69 (DE1), Tangent\_76 (DE1), Tangerine\_73 (DE1), Thing3\_72 (DE1), Tycho\_71 (DE1), Vivi2\_78 (DE1), YorkOnyx\_73 (DE1),

Start 17:

- Found in 7 of 82 ( 8.5% ) of genes in pham
- Manual Annotations of this start: 5 of 67
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Chickadee\_69 (DE3), EdmundFerry\_67 (DE3), GTE6\_70 (DE3), Kwekel\_69 (DE3), RoadKill\_66 (DE3), Tiamoceli\_68 (DE3), Twonlo\_67 (DE3),

### **Summary by clusters:**

There are 9 clusters represented in this pham: DN, DH, DE1, DD, DE3, CZ6, CZ, DN1, DN3,

Info for manual annotations of cluster CZ:

- Start number 12 was manually annotated 1 time for cluster CZ.

Info for manual annotations of cluster CZ6:

- Start number 12 was manually annotated 1 time for cluster CZ6.

Info for manual annotations of cluster DD:

- Start number 13 was manually annotated 2 times for cluster DD.

Info for manual annotations of cluster DE1:

- Start number 15 was manually annotated 42 times for cluster DE1.

Info for manual annotations of cluster DE3:

- Start number 17 was manually annotated 5 times for cluster DE3.

Info for manual annotations of cluster DH:

- Start number 12 was manually annotated 2 times for cluster DH.

Info for manual annotations of cluster DN:

- Start number 12 was manually annotated 2 times for cluster DN.

Info for manual annotations of cluster DN1:

- Start number 12 was manually annotated 10 times for cluster DN1.

Info for manual annotations of cluster DN3:

- Start number 12 was manually annotated 2 times for cluster DN3.

### **Gene Information:**

Gene: Affeca\_74 Start: 55215, Stop: 55478, Start Num: 15

Candidate Starts for Affeca\_74:

(Start: 15 @55215 has 42 MA's), (19, 55257), (21, 55275), (27, 55347), (33, 55419), (34, 55428),

Gene: Ailee\_71 Start: 54203, Stop: 54466, Start Num: 15

Candidate Starts for Ailee\_71:

(Start: 15 @54203 has 42 MA's), (19, 54245), (21, 54263), (27, 54335), (33, 54407), (34, 54416),

Gene: Angelicage\_72 Start: 55142, Stop: 55405, Start Num: 15

Candidate Starts for Angelicage\_72:

(Start: 15 @55142 has 42 MA's), (19, 55184), (21, 55202), (27, 55274), (33, 55346), (34, 55355),

Gene: Apricot\_71 Start: 42366, Stop: 42629, Start Num: 12

Candidate Starts for Apricot\_71:

(Start: 12 @42366 has 18 MA's), (16, 42390), (21, 42444), (25, 42495), (27, 42516), (29, 42546), (32, 42576), (35, 42591), (36, 42594),

Gene: Asapag\_71 Start: 42662, Stop: 42931, Start Num: 12

Candidate Starts for Asapag\_71:

(Start: 12 @42662 has 18 MA's), (16, 42692), (21, 42746), (28, 42827), (31, 42869), (32, 42878), (35, 42893), (36, 42896),

Gene: Ashertheman\_72 Start: 53356, Stop: 53622, Start Num: 15

Candidate Starts for Ashertheman\_72:

(5, 53242), (Start: 15 @53356 has 42 MA's), (19, 53398), (21, 53416), (31, 53548), (33, 53560), (34, 53569),

Gene: BENtherdunthat\_75 Start: 43714, Stop: 43977, Start Num: 12

Candidate Starts for BENtherdunthat\_75:

(Start: 12 @43714 has 18 MA's), (16, 43738), (21, 43792), (25, 43843), (27, 43864), (29, 43894), (32, 43924), (35, 43939), (36, 43942),

Gene: Baddon\_70 Start: 54008, Stop: 54274, Start Num: 15

Candidate Starts for Baddon\_70:

(5, 53894), (Start: 15 @54008 has 42 MA's), (19, 54050), (21, 54068), (31, 54200), (33, 54212), (34, 54221),

Gene: Barsten\_74 Start: 54975, Stop: 55238, Start Num: 15

Candidate Starts for Barsten\_74:

(Start: 15 @54975 has 42 MA's), (19, 55017), (21, 55035), (27, 55107), (33, 55179), (34, 55188),

Gene: Baumdotcom\_70 Start: 53327, Stop: 53593, Start Num: 15

Candidate Starts for Baumdotcom\_70:

(5, 53213), (Start: 15 @53327 has 42 MA's), (19, 53369), (21, 53387), (31, 53519), (33, 53531), (34, 53540),

Gene: Bibwit\_72 Start: 53844, Stop: 54107, Start Num: 15

Candidate Starts for Bibwit\_72:

(Start: 15 @53844 has 42 MA's), (19, 53886), (21, 53904), (27, 53976), (33, 54048), (34, 54057),

Gene: Birdsong\_70 Start: 42398, Stop: 42667, Start Num: 12

Candidate Starts for Birdsong\_70:

(Start: 12 @42398 has 18 MA's), (16, 42428), (21, 42482), (28, 42563), (31, 42605), (32, 42614), (35, 42629), (36, 42632),

Gene: Bizzy\_73 Start: 53240, Stop: 53506, Start Num: 15

Candidate Starts for Bizzy\_73:

(2, 52979), (5, 53126), (Start: 15 @53240 has 42 MA's), (19, 53282), (21, 53300), (31, 53432), (33, 53444), (34, 53453),

Gene: BobBob\_74 Start: 54378, Stop: 54641, Start Num: 15

Candidate Starts for BobBob\_74:

(Start: 15 @54378 has 42 MA's), (19, 54420), (20, 54423), (21, 54438), (27, 54510), (33, 54582), (34, 54591),

Gene: Brandonk123\_78 Start: 54847, Stop: 55110, Start Num: 15

Candidate Starts for Brandonk123\_78:

(Start: 15 @54847 has 42 MA's), (19, 54889), (21, 54907), (27, 54979), (33, 55051), (34, 55060),

Gene: Budski\_77 Start: 44519, Stop: 44788, Start Num: 12

Candidate Starts for Budski\_77:

(Start: 12 @44519 has 18 MA's), (16, 44549), (21, 44603), (25, 44654), (27, 44675), (29, 44705), (32, 44735), (35, 44750), (36, 44753),

Gene: Cardigan\_107 Start: 62658, Stop: 62927, Start Num: 13

Candidate Starts for Cardigan\_107:

(Start: 13 @62658 has 2 MA's), (18, 62685), (23, 62763), (24, 62769), (25, 62790), (31, 62862), (37, 62895),

Gene: ChadMasterC\_73 Start: 56203, Stop: 56466, Start Num: 15

Candidate Starts for ChadMasterC\_73:

(Start: 15 @56203 has 42 MA's), (19, 56245), (21, 56263), (27, 56335), (33, 56407), (34, 56416),

Gene: Charming\_77 Start: 54129, Stop: 54392, Start Num: 15

Candidate Starts for Charming\_77:

(Start: 15 @54129 has 42 MA's), (19, 54171), (20, 54174), (21, 54189), (27, 54261), (33, 54333), (34, 54342),

Gene: Chickadee\_69 Start: 49954, Stop: 50208, Start Num: 17

Candidate Starts for Chickadee\_69:

(1, 49513), (8, 49888), (Start: 17 @49954 has 5 MA's), (19, 49981), (21, 49999), (22, 50005), (38, 50176),

Gene: Crater\_71 Start: 42761, Stop: 43024, Start Num: 12

Candidate Starts for Crater\_71:

(Start: 12 @42761 has 18 MA's), (16, 42785), (21, 42839), (25, 42890), (27, 42911), (29, 42941), (32, 42971), (35, 42986), (36, 42989),

Gene: Derg\_70 Start: 52040, Stop: 52306, Start Num: 15

Candidate Starts for Derg\_70:

(2, 51779), (3, 51902), (5, 51926), (Start: 15 @52040 has 42 MA's), (19, 52082), (21, 52100), (31, 52232), (33, 52244), (34, 52253),

Gene: EdmundFerry\_67 Start: 49502, Stop: 49756, Start Num: 17

Candidate Starts for EdmundFerry\_67:

(1, 49061), (8, 49436), (Start: 17 @49502 has 5 MA's), (19, 49529), (21, 49547), (22, 49553), (38, 49724),

Gene: Fitzgerald\_72 Start: 54990, Stop: 55253, Start Num: 15

Candidate Starts for Fitzgerald\_72:

(Start: 15 @54990 has 42 MA's), (19, 55032), (21, 55050), (27, 55122), (33, 55194), (34, 55203),

Gene: Flatwoods\_72 Start: 52549, Stop: 52815, Start Num: 15

Candidate Starts for Flatwoods\_72:

(2, 52288), (3, 52411), (5, 52435), (Start: 15 @52549 has 42 MA's), (19, 52591), (21, 52609), (31, 52741), (33, 52753), (34, 52762),

Gene: Fosterous\_76 Start: 55123, Stop: 55386, Start Num: 15

Candidate Starts for Fosterous\_76:

(Start: 15 @55123 has 42 MA's), (19, 55165), (21, 55183), (27, 55255), (33, 55327), (34, 55336),

Gene: Frickyeah\_77 Start: 43797, Stop: 44066, Start Num: 12

Candidate Starts for Frickyeah\_77:

(Start: 12 @43797 has 18 MA's), (16, 43827), (21, 43881), (28, 43962), (31, 44004), (32, 44013), (35, 44028), (36, 44031),

Gene: GTE6\_70 Start: 50747, Stop: 51001, Start Num: 17

Candidate Starts for GTE6\_70:

(1, 50306), (8, 50681), (Start: 17 @50747 has 5 MA's), (19, 50774), (21, 50792), (22, 50798), (38, 50969),

Gene: Gaea\_73 Start: 53136, Stop: 53402, Start Num: 15

Candidate Starts for Gaea\_73:

(5, 53022), (Start: 15 @53136 has 42 MA's), (19, 53178), (21, 53196), (31, 53328), (33, 53340), (34, 53349),

Gene: Galadriel\_74 Start: 55083, Stop: 55346, Start Num: 15

Candidate Starts for Galadriel\_74:

(Start: 15 @55083 has 42 MA's), (19, 55125), (21, 55143), (27, 55215), (33, 55287), (34, 55296),

Gene: Geodirt\_72 Start: 55452, Stop: 55715, Start Num: 15

Candidate Starts for Geodirt\_72:

(Start: 15 @55452 has 42 MA's), (19, 55494), (21, 55512), (27, 55584), (33, 55656), (34, 55665),

Gene: Getalong\_74 Start: 44955, Stop: 45224, Start Num: 12

Candidate Starts for Getalong\_74:

(6, 44877), (Start: 12 @44955 has 18 MA's), (16, 44985), (21, 45039), (25, 45090), (27, 45111), (29, 45141), (32, 45171), (35, 45186), (36, 45189),

Gene: Gustavo\_74 Start: 54121, Stop: 54387, Start Num: 15

Candidate Starts for Gustavo\_74:

(5, 54007), (Start: 15 @54121 has 42 MA's), (19, 54163), (21, 54181), (31, 54313), (33, 54325), (34, 54334),

Gene: Holliday\_76 Start: 46772, Stop: 47032, Start Num: 12

Candidate Starts for Holliday\_76:

(Start: 12 @46772 has 18 MA's), (14, 46781), (16, 46793), (21, 46847), (28, 46928), (31, 46970), (32, 46979), (34, 46991), (35, 46994), (36, 46997),

Gene: JKSyngboy\_70 Start: 54029, Stop: 54295, Start Num: 15

Candidate Starts for JKSyngboy\_70:  
(Start: 15 @54029 has 42 MA's), (19, 54071), (21, 54089), (31, 54221), (33, 54233), (34, 54242),

Gene: Jabberwocky\_72 Start: 55216, Stop: 55479, Start Num: 15  
Candidate Starts for Jabberwocky\_72:  
(Start: 15 @55216 has 42 MA's), (19, 55258), (21, 55276), (27, 55348), (33, 55420), (34, 55429),

Gene: JonJames\_106 Start: 63189, Stop: 63458, Start Num: 13  
Candidate Starts for JonJames\_106:  
(9, 63150), (10, 63174), (11, 63177), (Start: 13 @63189 has 2 MA's), (18, 63216), (23, 63294), (24, 63300),

Gene: Kamaru\_70 Start: 42281, Stop: 42544, Start Num: 12  
Candidate Starts for Kamaru\_70:  
(Start: 12 @42281 has 18 MA's), (16, 42305), (21, 42359), (25, 42410), (27, 42431), (29, 42461), (32, 42491), (35, 42506), (36, 42509),

Gene: Kamashten\_72 Start: 54209, Stop: 54472, Start Num: 15  
Candidate Starts for Kamashten\_72:  
(Start: 15 @54209 has 42 MA's), (19, 54251), (21, 54269), (27, 54341), (33, 54413), (34, 54422),

Gene: Keitabear\_72 Start: 55765, Stop: 56028, Start Num: 15  
Candidate Starts for Keitabear\_72:  
(Start: 15 @55765 has 42 MA's), (19, 55807), (21, 55825), (27, 55897), (33, 55969), (34, 55978),

Gene: Kenna\_68 Start: 42395, Stop: 42664, Start Num: 12  
Candidate Starts for Kenna\_68:  
(6, 42317), (Start: 12 @42395 has 18 MA's), (16, 42425), (21, 42479), (25, 42530), (27, 42551), (29, 42581), (32, 42611), (35, 42626), (36, 42629),

Gene: Kewpiedoll\_72 Start: 55139, Stop: 55402, Start Num: 15  
Candidate Starts for Kewpiedoll\_72:  
(Start: 15 @55139 has 42 MA's), (19, 55181), (21, 55199), (27, 55271), (33, 55343), (34, 55352),

Gene: Kroos\_72 Start: 53675, Stop: 53941, Start Num: 15  
Candidate Starts for Kroos\_72:  
(5, 53561), (Start: 15 @53675 has 42 MA's), (19, 53717), (21, 53735), (31, 53867), (33, 53879), (34, 53888),

Gene: Kwekel\_69 Start: 49867, Stop: 50121, Start Num: 17  
Candidate Starts for Kwekel\_69:  
(1, 49426), (8, 49801), (Start: 17 @49867 has 5 MA's), (19, 49894), (21, 49912), (22, 49918), (38, 50089),

Gene: Kwobi\_73 Start: 53940, Stop: 54206, Start Num: 15  
Candidate Starts for Kwobi\_73:  
(3, 53802), (5, 53826), (Start: 15 @53940 has 42 MA's), (19, 53982), (21, 54000), (31, 54132), (33, 54144), (34, 54153),

Gene: Lennon\_73 Start: 55866, Stop: 56129, Start Num: 15  
Candidate Starts for Lennon\_73:  
(Start: 15 @55866 has 42 MA's), (19, 55908), (21, 55926), (27, 55998), (33, 56070), (34, 56079),



Gene: Leroy\_71 Start: 42697, Stop: 42960, Start Num: 12  
Candidate Starts for Leroy\_71:  
(Start: 12 @42697 has 18 MA's), (16, 42721), (21, 42775), (25, 42826), (27, 42847), (29, 42877), (32, 42907), (35, 42922), (36, 42925),

Gene: LilHam\_66 Start: 51022, Stop: 51288, Start Num: 15  
Candidate Starts for LilHam\_66:  
(5, 50908), (Start: 15 @51022 has 42 MA's), (19, 51064), (21, 51082), (31, 51214), (33, 51226), (34, 51235),

Gene: Love\_78 Start: 55608, Stop: 55871, Start Num: 15  
Candidate Starts for Love\_78:  
(Start: 15 @55608 has 42 MA's), (19, 55650), (21, 55668), (27, 55740), (33, 55812), (34, 55821),

Gene: Lton\_50 Start: 32177, Stop: 32449, Start Num: 12  
Candidate Starts for Lton\_50:  
(6, 32099), (Start: 12 @32177 has 18 MA's), (16, 32207), (21, 32261), (26, 32324), (27, 32333), (30, 32375), (31, 32384), (32, 32393), (36, 32411),

Gene: Lucky10\_52 Start: 35182, Stop: 35445, Start Num: 12  
Candidate Starts for Lucky10\_52:  
(Start: 12 @35182 has 18 MA's), (16, 35206), (21, 35260), (25, 35311), (27, 35332), (29, 35362), (32, 35392), (35, 35407), (36, 35410),

Gene: Lutum\_74 Start: 43558, Stop: 43827, Start Num: 12  
Candidate Starts for Lutum\_74:  
(6, 43480), (Start: 12 @43558 has 18 MA's), (16, 43588), (21, 43642), (25, 43693), (27, 43714), (29, 43744), (32, 43774), (35, 43789), (36, 43792),

Gene: McKinley\_75 Start: 54726, Stop: 54989, Start Num: 15  
Candidate Starts for McKinley\_75:  
(Start: 15 @54726 has 42 MA's), (19, 54768), (21, 54786), (27, 54858), (33, 54930), (34, 54939),

Gene: MoontowerMania\_73 Start: 55562, Stop: 55825, Start Num: 15  
Candidate Starts for MoontowerMania\_73:  
(Start: 15 @55562 has 42 MA's), (19, 55604), (21, 55622), (27, 55694), (33, 55766), (34, 55775),

Gene: Morkie\_54 Start: 34409, Stop: 34672, Start Num: 12  
Candidate Starts for Morkie\_54:  
(Start: 12 @34409 has 18 MA's), (16, 34433), (21, 34487), (25, 34538), (27, 34559), (29, 34589), (32, 34619), (35, 34634), (36, 34637),

Gene: Nordenberg\_72 Start: 53789, Stop: 54052, Start Num: 15  
Candidate Starts for Nordenberg\_72:  
(Start: 15 @53789 has 42 MA's), (19, 53831), (21, 53849), (27, 53921), (33, 53993), (34, 54002),

Gene: OneDirection\_49 Start: 32104, Stop: 32367, Start Num: 12  
Candidate Starts for OneDirection\_49:  
(Start: 12 @32104 has 18 MA's), (16, 32128), (21, 32182), (28, 32263), (31, 32305), (32, 32314), (34, 32326), (35, 32329), (36, 32332),

Gene: Paries\_75 Start: 55227, Stop: 55490, Start Num: 15  
Candidate Starts for Paries\_75:

(Start: 15 @55227 has 42 MA's), (19, 55269), (21, 55287), (27, 55359), (33, 55431), (34, 55440),

Gene: Pepperoni\_50 Start: 33565, Stop: 33828, Start Num: 12

Candidate Starts for Pepperoni\_50:

(Start: 12 @33565 has 18 MA's), (16, 33589), (21, 33643), (28, 33724), (31, 33766), (32, 33775), (35, 33790), (36, 33793),

Gene: Periwinkle\_81 Start: 45861, Stop: 46124, Start Num: 12

Candidate Starts for Periwinkle\_81:

(Start: 12 @45861 has 18 MA's), (16, 45885), (21, 45939), (25, 45990), (27, 46011), (29, 46041), (32, 46071), (35, 46086), (36, 46089),

Gene: Phistory\_70 Start: 41926, Stop: 42189, Start Num: 12

Candidate Starts for Phistory\_70:

(Start: 12 @41926 has 18 MA's), (16, 41950), (21, 42004), (25, 42055), (27, 42076), (29, 42106), (32, 42136), (35, 42151), (36, 42154),

Gene: Ribeye\_72 Start: 53279, Stop: 53545, Start Num: 15

Candidate Starts for Ribeye\_72:

(2, 53018), (3, 53141), (5, 53165), (Start: 15 @53279 has 42 MA's), (19, 53321), (21, 53339), (31, 53471), (33, 53483), (34, 53492),

Gene: RoadKill\_66 Start: 49372, Stop: 49626, Start Num: 17

Candidate Starts for RoadKill\_66:

(1, 48931), (8, 49306), (Start: 17 @49372 has 5 MA's), (19, 49399), (21, 49417), (22, 49423), (38, 49594),

Gene: Rofo\_74 Start: 54705, Stop: 54968, Start Num: 15

Candidate Starts for Rofo\_74:

(Start: 15 @54705 has 42 MA's), (19, 54747), (20, 54750), (21, 54765), (27, 54837), (33, 54909), (34, 54918),

Gene: Sanjuju\_72 Start: 55080, Stop: 55343, Start Num: 15

Candidate Starts for Sanjuju\_72:

(Start: 15 @55080 has 42 MA's), (19, 55122), (21, 55140), (27, 55212), (33, 55284), (34, 55293),

Gene: Saronaya\_74 Start: 54121, Stop: 54387, Start Num: 15

Candidate Starts for Saronaya\_74:

(5, 54007), (Start: 15 @54121 has 42 MA's), (19, 54163), (21, 54181), (31, 54313), (33, 54325), (34, 54334),

Gene: SchottB\_70 Start: 53742, Stop: 54008, Start Num: 15

Candidate Starts for SchottB\_70:

(5, 53628), (Start: 15 @53742 has 42 MA's), (19, 53784), (21, 53802), (31, 53934), (33, 53946), (34, 53955),

Gene: Sedona\_72 Start: 55650, Stop: 55913, Start Num: 15

Candidate Starts for Sedona\_72:

(Start: 15 @55650 has 42 MA's), (19, 55692), (21, 55710), (27, 55782), (33, 55854), (34, 55863),

Gene: Shivanishola\_74 Start: 53430, Stop: 53693, Start Num: 15

Candidate Starts for Shivanishola\_74:

(Start: 15 @53430 has 42 MA's), (19, 53472), (21, 53490), (27, 53562), (33, 53634), (34, 53643),

Gene: Sitar\_73 Start: 55624, Stop: 55887, Start Num: 15

Candidate Starts for Sitar\_73:

(Start: 15 @55624 has 42 MA's), (19, 55666), (21, 55684), (27, 55756), (33, 55828), (34, 55837),

Gene: StorminNorm\_73 Start: 53909, Stop: 54175, Start Num: 15

Candidate Starts for StorminNorm\_73:

(5, 53795), (Start: 15 @53909 has 42 MA's), (19, 53951), (21, 53969), (31, 54101), (33, 54113), (34, 54122),

Gene: Stultus\_69 Start: 53871, Stop: 54134, Start Num: 15

Candidate Starts for Stultus\_69:

(Start: 15 @53871 has 42 MA's), (19, 53913), (21, 53931), (27, 54003), (33, 54075), (34, 54084),

Gene: Tangent\_76 Start: 54410, Stop: 54673, Start Num: 15

Candidate Starts for Tangent\_76:

(Start: 15 @54410 has 42 MA's), (19, 54452), (20, 54455), (21, 54470), (27, 54542), (33, 54614), (34, 54623),

Gene: Tangerine\_73 Start: 53415, Stop: 53681, Start Num: 15

Candidate Starts for Tangerine\_73:

(2, 53154), (5, 53301), (Start: 15 @53415 has 42 MA's), (19, 53457), (21, 53475), (31, 53607), (33, 53619), (34, 53628),

Gene: Thing3\_72 Start: 54209, Stop: 54472, Start Num: 15

Candidate Starts for Thing3\_72:

(Start: 15 @54209 has 42 MA's), (19, 54251), (21, 54269), (27, 54341), (33, 54413), (34, 54422),

Gene: Tiamoceli\_68 Start: 50834, Stop: 51088, Start Num: 17

Candidate Starts for Tiamoceli\_68:

(1, 50393), (8, 50768), (Start: 17 @50834 has 5 MA's), (19, 50861), (21, 50879), (22, 50885), (38, 51056),

Gene: Twonlo\_67 Start: 49926, Stop: 50180, Start Num: 17

Candidate Starts for Twonlo\_67:

(1, 49485), (8, 49860), (Start: 17 @49926 has 5 MA's), (19, 49953), (21, 49971), (38, 50148),

Gene: Tycho\_71 Start: 53228, Stop: 53494, Start Num: 15

Candidate Starts for Tycho\_71:

(2, 52967), (3, 53090), (5, 53114), (Start: 15 @53228 has 42 MA's), (19, 53270), (21, 53288), (31, 53420), (33, 53432), (34, 53441),

Gene: Vivi2\_78 Start: 55466, Stop: 55729, Start Num: 15

Candidate Starts for Vivi2\_78:

(Start: 15 @55466 has 42 MA's), (19, 55508), (20, 55511), (21, 55526), (27, 55598), (33, 55670), (34, 55679),

Gene: Whitney\_72 Start: 44432, Stop: 44701, Start Num: 12

Candidate Starts for Whitney\_72:

(Start: 12 @44432 has 18 MA's), (16, 44462), (21, 44516), (25, 44567), (27, 44588), (29, 44618), (32, 44648), (35, 44663), (36, 44666),

Gene: YorkOnyx\_73 Start: 53429, Stop: 53695, Start Num: 15

Candidate Starts for YorkOnyx\_73:

(5, 53315), (7, 53348), (Start: 15 @53429 has 42 MA's), (19, 53471), (21, 53489), (33, 53633), (34, 53642),

Gene: Yvonnetastic\_103 Start: 60354, Stop: 60623, Start Num: 13

Candidate Starts for Yvonnetastic\_103:

(4, 60249), (Start: 13 @60354 has 2 MA's), (18, 60381), (23, 60459), (24, 60465),