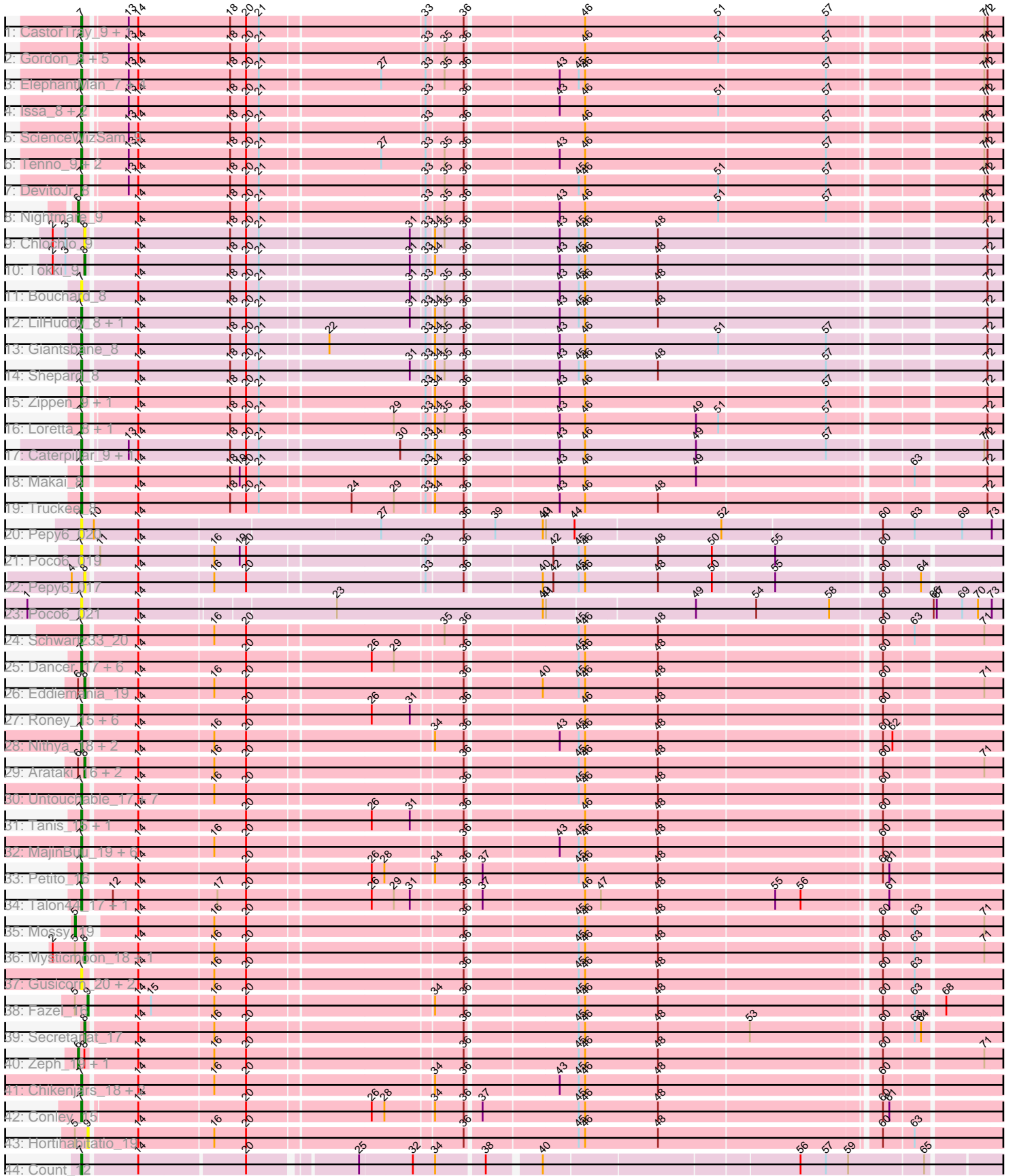


Zoomed Pham 205004



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 205004 Report

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

Pham number 205004 has 99 members, 27 are drafts.

Phages represented in each track:

- Track 1 : CastorTray\_9, Trustiboi\_8
- Track 2 : Gordon\_8, AreFloNak\_8, Tatanka\_7, Darby\_8, Nivinsha\_8, Synepsis\_7
- Track 3 : ElephantMan\_7, Niktson\_7, Acai\_8, Teacup\_8, Brunswick\_8
- Track 4 : Issa\_8, Breylor17\_8, LucySwiss\_8
- Track 5 : ScienceWizSam\_9
- Track 6 : Tenno\_9, CapnMurica\_8, MiniBagel\_8
- Track 7 : DevitoJr\_8
- Track 8 : Nightmare\_9
- Track 9 : Chlochlo\_9
- Track 10 : Tokki\_9
- Track 11 : Bouchard\_8
- Track 12 : LilHuddy\_8, Phaby\_8
- Track 13 : Giantsbane\_8
- Track 14 : Shepard\_8
- Track 15 : Zippen\_9, Inked\_9
- Track 16 : Loretta\_8, Ingrid\_8
- Track 17 : Caterpillar\_9, MediumFry\_9
- Track 18 : Makai\_8
- Track 19 : Truckee\_8
- Track 20 : Pepy6\_020
- Track 21 : Poco6\_019
- Track 22 : Pepy6\_017
- Track 23 : Poco6\_021
- Track 24 : Schwartz33\_20
- Track 25 : Dancer\_17, FortCran\_15, JulesRay\_17, Avazak\_15, Artorias\_15, Trufflozitus\_18, Captrips\_15
- Track 26 : Eddiemania\_19
- Track 27 : Roney\_15, Capybara\_15, Magel\_15, NoPickles\_15, Kerry\_15, Gravy\_15, Odesza\_15
- Track 28 : Nithya\_18, EndAve\_18, AlainaMarie\_18
- Track 29 : Arataki\_16, Kenosha\_17, Demure\_17
- Track 30 : Untouchable\_17, Nadmeg\_18, Vardy\_18, Crocheter\_17, Runhaar\_18, Burley\_18, Phepper\_18, Madvan\_18
- Track 31 : Tanis\_15, Gill\_15
- Track 32 : MajinBuu\_19, Aflac\_18, Jodelie19\_18, Figliar\_18, Rickmore\_17, TenaciousP\_18, BluerMoon\_20
- Track 33 : Petito\_16

- Track 34 : Talon44\_17, Perkunas\_17
- Track 35 : Mossy\_19
- Track 36 : Mysticmoon\_18, Pherobrine\_17
- Track 37 : Gusicorn\_20, BetterYeti\_20, ShaggyRogers\_21
- Track 38 : Fazel\_16
- Track 39 : Secretariat\_17
- Track 40 : Zeph\_19, Hydrus\_19
- Track 41 : Chikenjars\_18, Duffington\_18, Citrus\_17
- Track 42 : Conley\_15
- Track 43 : Hortihabitatio\_19
- Track 44 : Count\_12

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

The start number called the most often in the published annotations is 7, it was called in 62 of the 72 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Acai\_8, Aflac\_18, AlainaMarie\_18, AreFloNak\_8, Artorias\_15, Avazak\_15, BetterYeti\_20, BluerMoon\_20, Bouchard\_8, Breylor17\_8, Brunswick\_8, Burley\_18, CapnMurica\_8, Captrips\_15, Copybara\_15, CastorTray\_9, Caterpillar\_9, Chikenjars\_18, Citrus\_17, Conley\_15, Count\_12, Crocheter\_17, Dancer\_17, Darby\_8, DevitoJr\_8, Duffington\_18, ElephantMan\_7, EndAve\_18, Figliar\_18, FortCran\_15, Giantsbane\_8, Gill\_15, Gordon\_8, Gravy\_15, Gusicorn\_20, Ingrid\_8, Inked\_9, Issa\_8, Jodelie19\_18, JulesRay\_17, Kerry\_15, LilHuddy\_8, Loretta\_8, LucySwiss\_8, Madvan\_18, Magel\_15, MajinBuu\_19, Makai\_8, MediumFry\_9, MiniBagel\_8, Nadmeg\_18, Niktson\_7, Nithya\_18, Nivinsha\_8, NoPickles\_15, Odesza\_15, Pepy6\_020, Perkunas\_17, Petito\_16, Phaby\_8, Phepper\_18, Poco6\_019, Poco6\_021, Rickmore\_17, Roney\_15, Runhaar\_18, Schwartz33\_20, ScienceWizSam\_9, ShaggyRogers\_21, Shepard\_8, Synepsis\_7, Talon44\_17, Tanis\_15, Tatanka\_7, Teacup\_8, TenaciousP\_18, Tenno\_9, Truckee\_8, Trufflozitus\_18, Trustiboi\_8, Untouchable\_17, Vardy\_18, Zippen\_9,

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

- 

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

- Arataki\_16, Chlochlo\_9, Demure\_17, Eddiemania\_19, Fazel\_16, Hortihabitatio\_19, Hydrus\_19, Kenosha\_17, Mossy\_19, Mysticmoon\_18, Nightmare\_9, Pepy6\_017, Pherobrine\_17, Secretariat\_17, Tokki\_9, Zeph\_19,

**Summary by start number:**

Start 5:

- Found in 5 of 99 ( 5.1% ) of genes in pham
- Manual Annotations of this start: 1 of 72
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Mossy\_19 (DJ),

Start 6:

- Found in 7 of 99 ( 7.1% ) of genes in pham
- Manual Annotations of this start: 3 of 72
- Called 42.9% of time when present
- Phage (with cluster) where this start called: Hydrus\_19 (DJ), Nightmare\_9 (AU1), Zeph\_19 (DJ),

#### Start 7:

- Found in 83 of 99 ( 83.8% ) of genes in pham
- Manual Annotations of this start: 62 of 72
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Acai\_8 (AU1), Aflac\_18 (DJ), AlainaMarie\_18 (DJ), AreFloNak\_8 (AU1), Artorias\_15 (DJ), Avazak\_15 (DJ), BetterYeti\_20 (DJ), BluerMoon\_20 (DJ), Bouchard\_8 (AU2), Breylor17\_8 (AU1), Brunswick\_8 (AU1), Burley\_18 (DJ), CapnMurica\_8 (AU1), Captrips\_15 (DJ), Capybara\_15 (DJ), CastorTray\_9 (AU1), Caterpillar\_9 (AU4), Chikenjars\_18 (DJ), Citrus\_17 (DJ), Conley\_15 (DJ), Count\_12 (EL), Crocheter\_17 (DJ), Dancer\_17 (DJ), Darby\_8 (AU1), DevitoJr\_8 (AU1), Duffington\_18 (DJ), ElephantMan\_7 (AU1), EndAve\_18 (DJ), Figliar\_18 (DJ), FortCran\_15 (DJ), Giantsbane\_8 (AU2), Gill\_15 (DJ), Gordon\_8 (AU1), Gravy\_15 (DJ), Gusicorn\_20 (DJ), Ingrid\_8 (AU3), Inked\_9 (AU), Issa\_8 (AU1), Jodelie19\_18 (DJ), JulesRay\_17 (DJ), Kerry\_15 (DJ), LiiHuddy\_8 (AU2), Loretta\_8 (AU3), LucySwiss\_8 (AU1), Madvan\_18 (DJ), Magel\_15 (DJ), MajinBuu\_19 (DJ), Makai\_8 (AU5), MediumFry\_9 (AU4), MiniBagel\_8 (AU1), Nadmeg\_18 (DJ), Niktson\_7 (AU1), Nithya\_18 (DJ), Nivinsha\_8 (AU1), NoPickles\_15 (DJ), Odesza\_15 (DJ), Pepy6\_020 (CC), Perkunas\_17 (DJ), Petite\_16 (DJ), Phaby\_8 (AU2), Phepper\_18 (DJ), Poco6\_019 (CC), Poco6\_021 (CC), Rickmore\_17 (DJ), Roney\_15 (DJ), Runhaar\_18 (DJ), Schwartz33\_20 (DJ), ScienceWizSam\_9 (AU1), ShaggyRogers\_21 (DJ), Shepard\_8 (AU2), Synopsis\_7 (AU1), Talon44\_17 (DJ), Tanis\_15 (DJ), Tatanka\_7 (AU1), Teacup\_8 (AU1), TenaciousP\_18 (DJ), Tenno\_9 (AU1), Truckee\_8 (AU5), Trufflozitus\_18 (DJ), Trustiboi\_8 (AU1), Untouchable\_17 (DJ), Vardy\_18 (DJ), Zippen\_9 (AU3),

#### Start 8:

- Found in 12 of 99 ( 12.1% ) of genes in pham
- Manual Annotations of this start: 5 of 72
- Called 83.3% of time when present
- Phage (with cluster) where this start called: Arataki\_16 (DJ), Chlochlo\_9 (AU2), Demure\_17 (DJ), Eddiemania\_19 (DJ), Kenosha\_17 (DJ), Mysticmoon\_18 (DJ), Pepy6\_017 (CC), Pherobrine\_17 (DJ), Secretariat\_17 (DJ), Tokki\_9 (AU2),

#### Start 9:

- Found in 2 of 99 ( 2.0% ) of genes in pham
- Manual Annotations of this start: 1 of 72
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Fazel\_16 (DJ), Hortihabitatio\_19 (DJ),

### Summary by clusters:

There are 9 clusters represented in this pham: EL, DJ, CC, AU1, AU3, AU2, AU5, AU4, AU,

Info for manual annotations of cluster AU:

- Start number 7 was manually annotated 1 time for cluster AU.

Info for manual annotations of cluster AU1:

- Start number 6 was manually annotated 1 time for cluster AU1.
- Start number 7 was manually annotated 16 times for cluster AU1.

Info for manual annotations of cluster AU2:

- Start number 7 was manually annotated 4 times for cluster AU2.
- Start number 8 was manually annotated 1 time for cluster AU2.

Info for manual annotations of cluster AU3:

- Start number 7 was manually annotated 2 times for cluster AU3.

Info for manual annotations of cluster AU4:

- Start number 7 was manually annotated 2 times for cluster AU4.

Info for manual annotations of cluster AU5:

- Start number 7 was manually annotated 2 times for cluster AU5.

Info for manual annotations of cluster DJ:

- Start number 5 was manually annotated 1 time for cluster DJ.
- Start number 6 was manually annotated 2 times for cluster DJ.
- Start number 7 was manually annotated 34 times for cluster DJ.
- Start number 8 was manually annotated 4 times for cluster DJ.
- Start number 9 was manually annotated 1 time for cluster DJ.

Info for manual annotations of cluster EL:

- Start number 7 was manually annotated 1 time for cluster EL.

### **Gene Information:**

Gene: Acai\_8 Start: 5443, Stop: 6294, Start Num: 7

Candidate Starts for Acai\_8:

(Start: 7 @5443 has 62 MA's), (13, 5479), (14, 5488), (18, 5575), (20, 5590), (21, 5602), (27, 5710), (33, 5752), (35, 5767), (36, 5785), (43, 5866), (45, 5884), (46, 5890), (57, 6115), (71, 6244), (72, 6247), (76, 6280),

Gene: Aflac\_18 Start: 12253, Stop: 13095, Start Num: 7

Candidate Starts for Aflac\_18:

(Start: 7 @12253 has 62 MA's), (14, 12301), (16, 12370), (20, 12400), (36, 12592), (43, 12673), (45, 12691), (46, 12697), (48, 12766), (60, 12964),

Gene: AlainaMarie\_18 Start: 12243, Stop: 13085, Start Num: 7

Candidate Starts for AlainaMarie\_18:

(Start: 7 @12243 has 62 MA's), (14, 12291), (16, 12360), (20, 12390), (34, 12555), (36, 12582), (43, 12663), (45, 12681), (46, 12687), (48, 12756), (60, 12954), (62, 12963),

Gene: Arataki\_16 Start: 11412, Stop: 12251, Start Num: 8

Candidate Starts for Arataki\_16:

(Start: 6 @11406 has 3 MA's), (Start: 8 @11412 has 5 MA's), (14, 11457), (16, 11526), (20, 11556), (36, 11748), (45, 11847), (46, 11853), (48, 11922), (60, 12120), (71, 12207),

Gene: AreFloNak\_8 Start: 5330, Stop: 6178, Start Num: 7

Candidate Starts for AreFloNak\_8:

(Start: 7 @5330 has 62 MA's), (13, 5366), (14, 5375), (18, 5462), (20, 5477), (21, 5489), (33, 5636), (35, 5651), (36, 5669), (46, 5774), (51, 5900), (57, 5999), (71, 6128), (72, 6131), (76, 6164),

Gene: Artorias\_15 Start: 9651, Stop: 10493, Start Num: 7

Candidate Starts for Artorias\_15:

(Start: 7 @9651 has 62 MA's), (14, 9699), (20, 9798), (26, 9909), (29, 9930), (36, 9990), (45, 10089), (46, 10095), (48, 10164), (60, 10362),

Gene: Avazak\_15 Start: 9658, Stop: 10500, Start Num: 7

Candidate Starts for Avazak\_15:

(Start: 7 @9658 has 62 MA's), (14, 9706), (20, 9805), (26, 9916), (29, 9937), (36, 9997), (45, 10096), (46, 10102), (48, 10171), (60, 10369),

Gene: BetterYeti\_20 Start: 12043, Stop: 12885, Start Num: 7

Candidate Starts for BetterYeti\_20:

(Start: 7 @12043 has 62 MA's), (14, 12091), (16, 12160), (20, 12190), (36, 12382), (45, 12481), (46, 12487), (48, 12556), (60, 12754), (63, 12781),

Gene: BluerMoon\_20 Start: 12247, Stop: 13089, Start Num: 7

Candidate Starts for BluerMoon\_20:

(Start: 7 @12247 has 62 MA's), (14, 12295), (16, 12364), (20, 12394), (36, 12586), (43, 12667), (45, 12685), (46, 12691), (48, 12760), (60, 12958),

Gene: Bouchard\_8 Start: 5260, Stop: 6111, Start Num: 7

Candidate Starts for Bouchard\_8:

(Start: 7 @5260 has 62 MA's), (14, 5308), (18, 5395), (20, 5410), (21, 5422), (31, 5557), (33, 5569), (35, 5584), (36, 5602), (43, 5683), (45, 5701), (46, 5707), (48, 5776), (72, 6064), (76, 6097),

Gene: Breylor17\_8 Start: 5455, Stop: 6303, Start Num: 7

Candidate Starts for Breylor17\_8:

(Start: 7 @5455 has 62 MA's), (13, 5491), (14, 5500), (18, 5587), (20, 5602), (21, 5614), (33, 5761), (36, 5794), (43, 5875), (46, 5899), (51, 6025), (57, 6124), (71, 6253), (72, 6256), (76, 6289),

Gene: Brunswick\_8 Start: 5440, Stop: 6291, Start Num: 7

Candidate Starts for Brunswick\_8:

(Start: 7 @5440 has 62 MA's), (13, 5476), (14, 5485), (18, 5572), (20, 5587), (21, 5599), (27, 5707), (33, 5749), (35, 5764), (36, 5782), (43, 5863), (45, 5881), (46, 5887), (57, 6112), (71, 6241), (72, 6244), (76, 6277),

Gene: Burley\_18 Start: 12011, Stop: 12853, Start Num: 7

Candidate Starts for Burley\_18:

(Start: 7 @12011 has 62 MA's), (14, 12059), (16, 12128), (20, 12158), (36, 12350), (45, 12449), (46, 12455), (48, 12524), (60, 12722),

Gene: CapnMurica\_8 Start: 6536, Stop: 7387, Start Num: 7

Candidate Starts for CapnMurica\_8:

(Start: 7 @6536 has 62 MA's), (13, 6572), (14, 6581), (18, 6668), (20, 6683), (21, 6695), (27, 6803), (33, 6845), (35, 6860), (36, 6878), (43, 6959), (46, 6983), (57, 7208), (71, 7337), (72, 7340), (76, 7373),

Gene: Captrips\_15 Start: 9658, Stop: 10500, Start Num: 7

Candidate Starts for Captrips\_15:

(Start: 7 @9658 has 62 MA's), (14, 9706), (20, 9805), (26, 9916), (29, 9937), (36, 9997), (45, 10096), (46, 10102), (48, 10171), (60, 10369),

Gene: Capybara\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Capybara\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: CastorTray\_9 Start: 5309, Stop: 6157, Start Num: 7

Candidate Starts for CastorTray\_9:

(Start: 7 @5309 has 62 MA's), (13, 5345), (14, 5354), (18, 5441), (20, 5456), (21, 5468), (33, 5615), (36, 5648), (46, 5753), (51, 5879), (57, 5978), (71, 6107), (72, 6110), (76, 6143),

Gene: Caterpillar\_9 Start: 5548, Stop: 6399, Start Num: 7

Candidate Starts for Caterpillar\_9:

(Start: 7 @5548 has 62 MA's), (13, 5584), (14, 5593), (18, 5680), (20, 5695), (21, 5707), (30, 5833), (33, 5857), (34, 5863), (36, 5890), (43, 5971), (46, 5995), (49, 6100), (57, 6220), (71, 6349), (72, 6352), (76, 6385),

Gene: Chikenjars\_18 Start: 12243, Stop: 13085, Start Num: 7

Candidate Starts for Chikenjars\_18:

(Start: 7 @12243 has 62 MA's), (14, 12291), (16, 12360), (20, 12390), (34, 12555), (36, 12582), (43, 12663), (45, 12681), (46, 12687), (48, 12756), (60, 12954),

Gene: Chlochlo\_9 Start: 5868, Stop: 6716, Start Num: 8

Candidate Starts for Chlochlo\_9:

(2, 5838), (3, 5850), (Start: 8 @5868 has 5 MA's), (14, 5913), (18, 6000), (20, 6015), (21, 6027), (31, 6162), (33, 6174), (34, 6180), (35, 6189), (36, 6207), (43, 6288), (45, 6306), (46, 6312), (48, 6381), (72, 6669), (76, 6702),

Gene: Citrus\_17 Start: 12250, Stop: 13092, Start Num: 7

Candidate Starts for Citrus\_17:

(Start: 7 @12250 has 62 MA's), (14, 12298), (16, 12367), (20, 12397), (34, 12562), (36, 12589), (43, 12670), (45, 12688), (46, 12694), (48, 12763), (60, 12961),

Gene: Conley\_15 Start: 9685, Stop: 10524, Start Num: 7

Candidate Starts for Conley\_15:

(Start: 7 @9685 has 62 MA's), (14, 9730), (20, 9829), (26, 9940), (28, 9952), (34, 9994), (36, 10021), (37, 10033), (45, 10120), (46, 10126), (48, 10195), (60, 10393), (61, 10399), (77, 10516),

Gene: Count\_12 Start: 6180, Stop: 7169, Start Num: 7

Candidate Starts for Count\_12:

(Start: 7 @6180 has 62 MA's), (14, 6228), (20, 6324), (25, 6414), (32, 6462), (34, 6483), (38, 6525), (40, 6570), (56, 6798), (57, 6822), (59, 6843), (65, 6912), (78, 7011), (79, 7026), (82, 7077), (84, 7146),

Gene: Crocheter\_17 Start: 10971, Stop: 11813, Start Num: 7

Candidate Starts for Crocheter\_17:

(Start: 7 @10971 has 62 MA's), (14, 11019), (16, 11088), (20, 11118), (36, 11310), (45, 11409), (46, 11415), (48, 11484), (60, 11682),

Gene: Dancer\_17 Start: 9357, Stop: 10199, Start Num: 7

Candidate Starts for Dancer\_17:

(Start: 7 @9357 has 62 MA's), (14, 9405), (20, 9504), (26, 9615), (29, 9636), (36, 9696), (45, 9795), (46, 9801), (48, 9870), (60, 10068),

Gene: Darby\_8 Start: 5312, Stop: 6160, Start Num: 7

Candidate Starts for Darby\_8:

(Start: 7 @5312 has 62 MA's), (13, 5348), (14, 5357), (18, 5444), (20, 5459), (21, 5471), (33, 5618), (35, 5633), (36, 5651), (46, 5756), (51, 5882), (57, 5981), (71, 6110), (72, 6113), (76, 6146),

Gene: Demure\_17 Start: 11412, Stop: 12251, Start Num: 8

Candidate Starts for Demure\_17:

(Start: 6 @11406 has 3 MA's), (Start: 8 @11412 has 5 MA's), (14, 11457), (16, 11526), (20, 11556), (36, 11748), (45, 11847), (46, 11853), (48, 11922), (60, 12120), (71, 12207),

Gene: DevitoJr\_8 Start: 5454, Stop: 6302, Start Num: 7

Candidate Starts for DevitoJr\_8:

(Start: 7 @5454 has 62 MA's), (13, 5490), (14, 5499), (18, 5586), (20, 5601), (21, 5613), (33, 5760), (35, 5775), (36, 5793), (45, 5892), (46, 5898), (51, 6024), (57, 6123), (71, 6252), (72, 6255), (76, 6288),

Gene: Duffington\_18 Start: 12228, Stop: 13070, Start Num: 7

Candidate Starts for Duffington\_18:

(Start: 7 @12228 has 62 MA's), (14, 12276), (16, 12345), (20, 12375), (34, 12540), (36, 12567), (43, 12648), (45, 12666), (46, 12672), (48, 12741), (60, 12939),

Gene: Eddiemania\_19 Start: 13011, Stop: 13850, Start Num: 8

Candidate Starts for Eddiemania\_19:

(Start: 6 @13005 has 3 MA's), (Start: 8 @13011 has 5 MA's), (14, 13056), (16, 13125), (20, 13155), (36, 13347), (40, 13413), (45, 13446), (46, 13452), (48, 13521), (60, 13719), (71, 13806),

Gene: ElephantMan\_7 Start: 5470, Stop: 6321, Start Num: 7

Candidate Starts for ElephantMan\_7:

(Start: 7 @5470 has 62 MA's), (13, 5506), (14, 5515), (18, 5602), (20, 5617), (21, 5629), (27, 5737), (33, 5779), (35, 5794), (36, 5812), (43, 5893), (45, 5911), (46, 5917), (57, 6142), (71, 6271), (72, 6274), (76, 6307),

Gene: EndAve\_18 Start: 12243, Stop: 13085, Start Num: 7

Candidate Starts for EndAve\_18:

(Start: 7 @12243 has 62 MA's), (14, 12291), (16, 12360), (20, 12390), (34, 12555), (36, 12582), (43, 12663), (45, 12681), (46, 12687), (48, 12756), (60, 12954), (62, 12963),

Gene: Fazel\_16 Start: 11367, Stop: 12203, Start Num: 9

Candidate Starts for Fazel\_16:

(Start: 5 @11355 has 1 MA's), (Start: 9 @11367 has 1 MA's), (14, 11409), (15, 11421), (16, 11478), (20, 11508), (34, 11673), (36, 11700), (45, 11799), (46, 11805), (48, 11874), (60, 12072), (63, 12099), (68, 12123),

Gene: Figliar\_18 Start: 12253, Stop: 13095, Start Num: 7

Candidate Starts for Figliar\_18:

(Start: 7 @12253 has 62 MA's), (14, 12301), (16, 12370), (20, 12400), (36, 12592), (43, 12673), (45, 12691), (46, 12697), (48, 12766), (60, 12964),

Gene: FortCran\_15 Start: 9651, Stop: 10493, Start Num: 7

Candidate Starts for FortCran\_15:



(Start: 7 @9651 has 62 MA's), (14, 9699), (20, 9798), (26, 9909), (29, 9930), (36, 9990), (45, 10089), (46, 10095), (48, 10164), (60, 10362),

Gene: Giantsbane\_8 Start: 5270, Stop: 6124, Start Num: 7

Candidate Starts for Giantsbane\_8:

(Start: 7 @5270 has 62 MA's), (14, 5318), (18, 5405), (20, 5420), (21, 5432), (22, 5492), (33, 5582), (34, 5588), (35, 5597), (36, 5615), (43, 5696), (46, 5720), (51, 5846), (57, 5945), (72, 6077), (76, 6110),

Gene: Gill\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Gill\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: Gordon\_8 Start: 6578, Stop: 7426, Start Num: 7

Candidate Starts for Gordon\_8:

(Start: 7 @6578 has 62 MA's), (13, 6614), (14, 6623), (18, 6710), (20, 6725), (21, 6737), (33, 6884), (35, 6899), (36, 6917), (46, 7022), (51, 7148), (57, 7247), (71, 7376), (72, 7379), (76, 7412),

Gene: Gravy\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Gravy\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: Gusicorn\_20 Start: 12043, Stop: 12885, Start Num: 7

Candidate Starts for Gusicorn\_20:

(Start: 7 @12043 has 62 MA's), (14, 12091), (16, 12160), (20, 12190), (36, 12382), (45, 12481), (46, 12487), (48, 12556), (60, 12754), (63, 12781),

Gene: Hortihabitatio\_19 Start: 11738, Stop: 12574, Start Num: 9

Candidate Starts for Hortihabitatio\_19:

(Start: 5 @11726 has 1 MA's), (Start: 9 @11738 has 1 MA's), (14, 11780), (16, 11849), (20, 11879), (36, 12071), (45, 12170), (46, 12176), (48, 12245), (60, 12443), (63, 12470),

Gene: Hydrus\_19 Start: 12821, Stop: 13666, Start Num: 6

Candidate Starts for Hydrus\_19:

(Start: 6 @12821 has 3 MA's), (Start: 8 @12827 has 5 MA's), (14, 12872), (16, 12941), (20, 12971), (36, 13163), (45, 13262), (46, 13268), (48, 13337), (60, 13535), (71, 13622),

Gene: Ingrid\_8 Start: 5356, Stop: 6204, Start Num: 7

Candidate Starts for Ingrid\_8:

(Start: 7 @5356 has 62 MA's), (14, 5401), (18, 5488), (20, 5503), (21, 5515), (29, 5635), (33, 5662), (34, 5668), (35, 5677), (36, 5695), (43, 5776), (46, 5800), (49, 5905), (51, 5926), (57, 6025), (72, 6157), (76, 6190),

Gene: Inked\_9 Start: 5530, Stop: 6381, Start Num: 7

Candidate Starts for Inked\_9:

(Start: 7 @5530 has 62 MA's), (14, 5575), (18, 5662), (20, 5677), (21, 5689), (33, 5839), (34, 5845), (36, 5872), (43, 5953), (46, 5977), (57, 6202), (72, 6334), (76, 6367),

Gene: Issa\_8 Start: 5285, Stop: 6133, Start Num: 7

Candidate Starts for Issa\_8:

(Start: 7 @5285 has 62 MA's), (13, 5321), (14, 5330), (18, 5417), (20, 5432), (21, 5444), (33, 5591), (36, 5624), (43, 5705), (46, 5729), (51, 5855), (57, 5954), (71, 6083), (72, 6086), (76, 6119),

Gene: Jodelie19\_18 Start: 12247, Stop: 13089, Start Num: 7

Candidate Starts for Jodelie19\_18:

(Start: 7 @12247 has 62 MA's), (14, 12295), (16, 12364), (20, 12394), (36, 12586), (43, 12667), (45, 12685), (46, 12691), (48, 12760), (60, 12958),

Gene: JulesRay\_17 Start: 9651, Stop: 10493, Start Num: 7

Candidate Starts for JulesRay\_17:

(Start: 7 @9651 has 62 MA's), (14, 9699), (20, 9798), (26, 9909), (29, 9930), (36, 9990), (45, 10089), (46, 10095), (48, 10164), (60, 10362),

Gene: Kenosha\_17 Start: 11428, Stop: 12267, Start Num: 8

Candidate Starts for Kenosha\_17:

(Start: 6 @11422 has 3 MA's), (Start: 8 @11428 has 5 MA's), (14, 11473), (16, 11542), (20, 11572), (36, 11764), (45, 11863), (46, 11869), (48, 11938), (60, 12136), (71, 12223),

Gene: Kerry\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Kerry\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: LilHuddy\_8 Start: 5267, Stop: 6118, Start Num: 7

Candidate Starts for LilHuddy\_8:

(Start: 7 @5267 has 62 MA's), (14, 5315), (18, 5402), (20, 5417), (21, 5429), (31, 5564), (33, 5576), (34, 5582), (35, 5591), (36, 5609), (43, 5690), (45, 5708), (46, 5714), (48, 5783), (72, 6071), (76, 6104),

Gene: Loretta\_8 Start: 5356, Stop: 6204, Start Num: 7

Candidate Starts for Loretta\_8:

(Start: 7 @5356 has 62 MA's), (14, 5401), (18, 5488), (20, 5503), (21, 5515), (29, 5635), (33, 5662), (34, 5668), (35, 5677), (36, 5695), (43, 5776), (46, 5800), (49, 5905), (51, 5926), (57, 6025), (72, 6157), (76, 6190),

Gene: LucySwiss\_8 Start: 5304, Stop: 6152, Start Num: 7

Candidate Starts for LucySwiss\_8:

(Start: 7 @5304 has 62 MA's), (13, 5340), (14, 5349), (18, 5436), (20, 5451), (21, 5463), (33, 5610), (36, 5643), (43, 5724), (46, 5748), (51, 5874), (57, 5973), (71, 6102), (72, 6105), (76, 6138),

Gene: Madvan\_18 Start: 12044, Stop: 12886, Start Num: 7

Candidate Starts for Madvan\_18:

(Start: 7 @12044 has 62 MA's), (14, 12092), (16, 12161), (20, 12191), (36, 12383), (45, 12482), (46, 12488), (48, 12557), (60, 12755),

Gene: Magel\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Magel\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: MajinBuu\_19 Start: 12248, Stop: 13090, Start Num: 7

Candidate Starts for MajinBuu\_19:

(Start: 7 @12248 has 62 MA's), (14, 12296), (16, 12365), (20, 12395), (36, 12587), (43, 12668), (45, 12686), (46, 12692), (48, 12761), (60, 12959),

Gene: Makai\_8 Start: 5396, Stop: 6247, Start Num: 7

Candidate Starts for Makai\_8:

(Start: 7 @5396 has 62 MA's), (14, 5444), (18, 5531), (19, 5540), (20, 5546), (21, 5558), (33, 5705), (34, 5711), (36, 5738), (43, 5819), (46, 5843), (49, 5948), (63, 6137), (72, 6200), (76, 6233),

Gene: MediumFry\_9 Start: 5577, Stop: 6428, Start Num: 7

Candidate Starts for MediumFry\_9:

(Start: 7 @5577 has 62 MA's), (13, 5613), (14, 5622), (18, 5709), (20, 5724), (21, 5736), (30, 5862), (33, 5886), (34, 5892), (36, 5919), (43, 6000), (46, 6024), (49, 6129), (57, 6249), (71, 6378), (72, 6381), (76, 6414),

Gene: MiniBagel\_8 Start: 6536, Stop: 7387, Start Num: 7

Candidate Starts for MiniBagel\_8:

(Start: 7 @6536 has 62 MA's), (13, 6572), (14, 6581), (18, 6668), (20, 6683), (21, 6695), (27, 6803), (33, 6845), (35, 6860), (36, 6878), (43, 6959), (46, 6983), (57, 7208), (71, 7337), (72, 7340), (76, 7373),

Gene: Mossy\_19 Start: 13461, Stop: 14300, Start Num: 5

Candidate Starts for Mossy\_19:

(Start: 5 @13461 has 1 MA's), (14, 13506), (16, 13575), (20, 13605), (36, 13797), (45, 13896), (46, 13902), (48, 13971), (60, 14169), (63, 14196), (71, 14256),

Gene: Mysticmoon\_18 Start: 12102, Stop: 12941, Start Num: 8

Candidate Starts for Mysticmoon\_18:

(2, 12072), (Start: 5 @12093 has 1 MA's), (Start: 8 @12102 has 5 MA's), (14, 12147), (16, 12216), (20, 12246), (36, 12438), (45, 12537), (46, 12543), (48, 12612), (60, 12810), (63, 12837), (71, 12897),

Gene: Nadmeg\_18 Start: 12045, Stop: 12887, Start Num: 7

Candidate Starts for Nadmeg\_18:

(Start: 7 @12045 has 62 MA's), (14, 12093), (16, 12162), (20, 12192), (36, 12384), (45, 12483), (46, 12489), (48, 12558), (60, 12756),

Gene: Nightmare\_9 Start: 5909, Stop: 6760, Start Num: 6

Candidate Starts for Nightmare\_9:

(Start: 6 @5909 has 3 MA's), (14, 5957), (18, 6044), (20, 6059), (21, 6071), (33, 6218), (35, 6233), (36, 6251), (43, 6332), (46, 6356), (51, 6482), (57, 6581), (71, 6710), (72, 6713), (76, 6746),

Gene: Niktson\_7 Start: 5470, Stop: 6321, Start Num: 7

Candidate Starts for Niktson\_7:

(Start: 7 @5470 has 62 MA's), (13, 5506), (14, 5515), (18, 5602), (20, 5617), (21, 5629), (27, 5737), (33, 5779), (35, 5794), (36, 5812), (43, 5893), (45, 5911), (46, 5917), (57, 6142), (71, 6271), (72, 6274), (76, 6307),

Gene: Nithya\_18 Start: 12243, Stop: 13085, Start Num: 7

Candidate Starts for Nithya\_18:

(Start: 7 @12243 has 62 MA's), (14, 12291), (16, 12360), (20, 12390), (34, 12555), (36, 12582), (43, 12663), (45, 12681), (46, 12687), (48, 12756), (60, 12954), (62, 12963),

Gene: Nivinsha\_8 Start: 5330, Stop: 6178, Start Num: 7

Candidate Starts for Nivinsha\_8:

(Start: 7 @5330 has 62 MA's), (13, 5366), (14, 5375), (18, 5462), (20, 5477), (21, 5489), (33, 5636), (35, 5651), (36, 5669), (46, 5774), (51, 5900), (57, 5999), (71, 6128), (72, 6131), (76, 6164),

Gene: NoPickles\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for NoPickles\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: Odesza\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Odesza\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: Pepy6\_020 Start: 18201, Stop: 19283, Start Num: 7

Candidate Starts for Pepy6\_020:

(Start: 7 @18201 has 62 MA's), (10, 18213), (14, 18255), (27, 18477), (36, 18555), (39, 18585), (40, 18630), (41, 18633), (44, 18660), (52, 18795), (60, 18942), (63, 18972), (69, 19017), (73, 19044), (74, 19065), (80, 19134), (81, 19146), (83, 19203),

Gene: Pepy6\_017 Start: 15271, Stop: 16104, Start Num: 8

Candidate Starts for Pepy6\_017:

(4, 15259), (Start: 8 @15271 has 5 MA's), (14, 15316), (16, 15385), (20, 15415), (33, 15574), (36, 15607), (40, 15673), (42, 15682), (45, 15706), (46, 15712), (48, 15781), (50, 15832), (55, 15889), (60, 15979), (64, 16012),

Gene: Perkunas\_17 Start: 10170, Stop: 11000, Start Num: 7

Candidate Starts for Perkunas\_17:

(Start: 7 @10170 has 62 MA's), (12, 10194), (14, 10218), (17, 10290), (20, 10317), (26, 10428), (29, 10449), (31, 10464), (36, 10509), (37, 10521), (46, 10614), (47, 10629), (48, 10683), (55, 10791), (56, 10815), (61, 10887),

Gene: Petito\_16 Start: 9875, Stop: 10717, Start Num: 7

Candidate Starts for Petito\_16:

(Start: 7 @9875 has 62 MA's), (14, 9923), (20, 10022), (26, 10133), (28, 10145), (34, 10187), (36, 10214), (37, 10226), (45, 10313), (46, 10319), (48, 10388), (60, 10586), (61, 10592),

Gene: Phaby\_8 Start: 5257, Stop: 6108, Start Num: 7

Candidate Starts for Phaby\_8:

(Start: 7 @5257 has 62 MA's), (14, 5305), (18, 5392), (20, 5407), (21, 5419), (31, 5554), (33, 5566), (34, 5572), (35, 5581), (36, 5599), (43, 5680), (45, 5698), (46, 5704), (48, 5773), (72, 6061), (76, 6094),

Gene: Phepper\_18 Start: 12043, Stop: 12885, Start Num: 7

Candidate Starts for Phepper\_18:

(Start: 7 @12043 has 62 MA's), (14, 12091), (16, 12160), (20, 12190), (36, 12382), (45, 12481), (46, 12487), (48, 12556), (60, 12754),

Gene: Pherobrine\_17 Start: 12100, Stop: 12939, Start Num: 8

Candidate Starts for Pherobrine\_17:

(2, 12070), (Start: 5 @12091 has 1 MA's), (Start: 8 @12100 has 5 MA's), (14, 12145), (16, 12214), (20, 12244), (36, 12436), (45, 12535), (46, 12541), (48, 12610), (60, 12808), (63, 12835), (71, 12895),

Gene: Poco6\_019 Start: 18028, Stop: 18864, Start Num: 7

Candidate Starts for Poco6\_019:

(Start: 7 @18028 has 62 MA's), (11, 18040), (14, 18076), (16, 18145), (19, 18169), (20, 18175), (33, 18334), (36, 18367), (42, 18442), (45, 18466), (46, 18472), (48, 18541), (50, 18592), (55, 18649), (60, 18739),

Gene: Poco6\_021 Start: 19849, Stop: 20922, Start Num: 7

Candidate Starts for Poco6\_021:

(1, 19798), (Start: 7 @19849 has 62 MA's), (14, 19900), (23, 20074), (40, 20269), (41, 20272), (49, 20407), (54, 20464), (58, 20533), (60, 20581), (66, 20629), (67, 20632), (69, 20656), (70, 20671), (73, 20683), (75, 20713), (81, 20785), (83, 20842),

Gene: Rickmore\_17 Start: 10813, Stop: 11655, Start Num: 7

Candidate Starts for Rickmore\_17:

(Start: 7 @10813 has 62 MA's), (14, 10861), (16, 10930), (20, 10960), (36, 11152), (43, 11233), (45, 11251), (46, 11257), (48, 11326), (60, 11524),

Gene: Roney\_15 Start: 9377, Stop: 10219, Start Num: 7

Candidate Starts for Roney\_15:

(Start: 7 @9377 has 62 MA's), (14, 9425), (20, 9524), (26, 9635), (31, 9671), (36, 9716), (46, 9821), (48, 9890), (60, 10088),

Gene: Runhaar\_18 Start: 12045, Stop: 12887, Start Num: 7

Candidate Starts for Runhaar\_18:

(Start: 7 @12045 has 62 MA's), (14, 12093), (16, 12162), (20, 12192), (36, 12384), (45, 12483), (46, 12489), (48, 12558), (60, 12756),

Gene: Schwartz33\_20 Start: 12921, Stop: 13763, Start Num: 7

Candidate Starts for Schwartz33\_20:

(Start: 7 @12921 has 62 MA's), (14, 12969), (16, 13038), (20, 13068), (35, 13242), (36, 13260), (45, 13359), (46, 13365), (48, 13434), (60, 13632), (63, 13659), (71, 13719),

Gene: ScienceWizSam\_9 Start: 5285, Stop: 6133, Start Num: 7

Candidate Starts for ScienceWizSam\_9:

(Start: 7 @5285 has 62 MA's), (13, 5321), (14, 5330), (18, 5417), (20, 5432), (21, 5444), (33, 5591), (36, 5624), (46, 5729), (57, 5954), (71, 6083), (72, 6086), (76, 6119),

Gene: Secretariat\_17 Start: 11631, Stop: 12470, Start Num: 8

Candidate Starts for Secretariat\_17:

(Start: 8 @11631 has 5 MA's), (14, 11676), (16, 11745), (20, 11775), (36, 11967), (45, 12066), (46, 12072), (48, 12141), (53, 12225), (60, 12339), (63, 12366), (64, 12372),

Gene: ShaggyRogers\_21 Start: 12042, Stop: 12884, Start Num: 7

Candidate Starts for ShaggyRogers\_21:

(Start: 7 @12042 has 62 MA's), (14, 12090), (16, 12159), (20, 12189), (36, 12381), (45, 12480), (46, 12486), (48, 12555), (60, 12753), (63, 12780),

Gene: Shepard\_8 Start: 5267, Stop: 6118, Start Num: 7

Candidate Starts for Shepard\_8:

(Start: 7 @5267 has 62 MA's), (14, 5315), (18, 5402), (20, 5417), (21, 5429), (31, 5564), (33, 5576), (34, 5582), (35, 5591), (36, 5609), (43, 5690), (45, 5708), (46, 5714), (48, 5783), (57, 5939), (72, 6071), (76, 6104),

Gene: Synopsis\_7 Start: 5450, Stop: 6298, Start Num: 7

Candidate Starts for Synopsis\_7:

(Start: 7 @5450 has 62 MA's), (13, 5486), (14, 5495), (18, 5582), (20, 5597), (21, 5609), (33, 5756), (35, 5771), (36, 5789), (46, 5894), (51, 6020), (57, 6119), (71, 6248), (72, 6251), (76, 6284),

Gene: Talon44\_17 Start: 9846, Stop: 10676, Start Num: 7

Candidate Starts for Talon44\_17:

(Start: 7 @9846 has 62 MA's), (12, 9870), (14, 9894), (17, 9966), (20, 9993), (26, 10104), (29, 10125), (31, 10140), (36, 10185), (37, 10197), (46, 10290), (47, 10305), (48, 10359), (55, 10467), (56, 10491), (61, 10563),

Gene: Tanis\_15 Start: 9227, Stop: 10069, Start Num: 7

Candidate Starts for Tanis\_15:

(Start: 7 @9227 has 62 MA's), (14, 9275), (20, 9374), (26, 9485), (31, 9521), (36, 9566), (46, 9671), (48, 9740), (60, 9938),

Gene: Tatanka\_7 Start: 5390, Stop: 6238, Start Num: 7

Candidate Starts for Tatanka\_7:

(Start: 7 @5390 has 62 MA's), (13, 5426), (14, 5435), (18, 5522), (20, 5537), (21, 5549), (33, 5696), (35, 5711), (36, 5729), (46, 5834), (51, 5960), (57, 6059), (71, 6188), (72, 6191), (76, 6224),

Gene: Teacup\_8 Start: 5285, Stop: 6136, Start Num: 7

Candidate Starts for Teacup\_8:

(Start: 7 @5285 has 62 MA's), (13, 5321), (14, 5330), (18, 5417), (20, 5432), (21, 5444), (27, 5552), (33, 5594), (35, 5609), (36, 5627), (43, 5708), (45, 5726), (46, 5732), (57, 5957), (71, 6086), (72, 6089), (76, 6122),

Gene: TenaciousP\_18 Start: 12247, Stop: 13089, Start Num: 7

Candidate Starts for TenaciousP\_18:

(Start: 7 @12247 has 62 MA's), (14, 12295), (16, 12364), (20, 12394), (36, 12586), (43, 12667), (45, 12685), (46, 12691), (48, 12760), (60, 12958),

Gene: Tenno\_9 Start: 6536, Stop: 7387, Start Num: 7

Candidate Starts for Tenno\_9:

(Start: 7 @6536 has 62 MA's), (13, 6572), (14, 6581), (18, 6668), (20, 6683), (21, 6695), (27, 6803), (33, 6845), (35, 6860), (36, 6878), (43, 6959), (46, 6983), (57, 7208), (71, 7337), (72, 7340), (76, 7373),

Gene: Tokki\_9 Start: 5877, Stop: 6725, Start Num: 8

Candidate Starts for Tokki\_9:

(2, 5847), (3, 5859), (Start: 8 @5877 has 5 MA's), (14, 5922), (18, 6009), (20, 6024), (21, 6036), (31, 6171), (33, 6183), (34, 6189), (36, 6216), (43, 6297), (45, 6315), (46, 6321), (48, 6390), (72, 6678), (76, 6711),

Gene: Truckee\_8 Start: 5343, Stop: 6194, Start Num: 7

Candidate Starts for Truckee\_8:

(Start: 7 @5343 has 62 MA's), (14, 5391), (18, 5478), (20, 5493), (21, 5505), (24, 5586), (29, 5625), (33, 5652), (34, 5658), (36, 5685), (43, 5766), (46, 5790), (48, 5859), (72, 6147), (76, 6180),

Gene: Trufflozitus\_18 Start: 9651, Stop: 10493, Start Num: 7

Candidate Starts for Trufflozitus\_18:

(Start: 7 @9651 has 62 MA's), (14, 9699), (20, 9798), (26, 9909), (29, 9930), (36, 9990), (45, 10089), (46, 10095), (48, 10164), (60, 10362),

Gene: Trustiboi\_8 Start: 5474, Stop: 6322, Start Num: 7

Candidate Starts for Trustiboi\_8:

(Start: 7 @5474 has 62 MA's), (13, 5510), (14, 5519), (18, 5606), (20, 5621), (21, 5633), (33, 5780), (36, 5813), (46, 5918), (51, 6044), (57, 6143), (71, 6272), (72, 6275), (76, 6308),

Gene: Untouchable\_17 Start: 10970, Stop: 11812, Start Num: 7

Candidate Starts for Untouchable\_17:

(Start: 7 @10970 has 62 MA's), (14, 11018), (16, 11087), (20, 11117), (36, 11309), (45, 11408), (46, 11414), (48, 11483), (60, 11681),

Gene: Vardy\_18 Start: 12010, Stop: 12852, Start Num: 7

Candidate Starts for Vardy\_18:

(Start: 7 @12010 has 62 MA's), (14, 12058), (16, 12127), (20, 12157), (36, 12349), (45, 12448), (46, 12454), (48, 12523), (60, 12721),

Gene: Zeph\_19 Start: 12803, Stop: 13648, Start Num: 6

Candidate Starts for Zeph\_19:

(Start: 6 @12803 has 3 MA's), (Start: 8 @12809 has 5 MA's), (14, 12854), (16, 12923), (20, 12953), (36, 13145), (45, 13244), (46, 13250), (48, 13319), (60, 13517), (71, 13604),

Gene: Zippen\_9 Start: 5561, Stop: 6412, Start Num: 7

Candidate Starts for Zippen\_9:

(Start: 7 @5561 has 62 MA's), (14, 5606), (18, 5693), (20, 5708), (21, 5720), (33, 5870), (34, 5876), (36, 5903), (43, 5984), (46, 6008), (57, 6233), (72, 6365), (76, 6398),