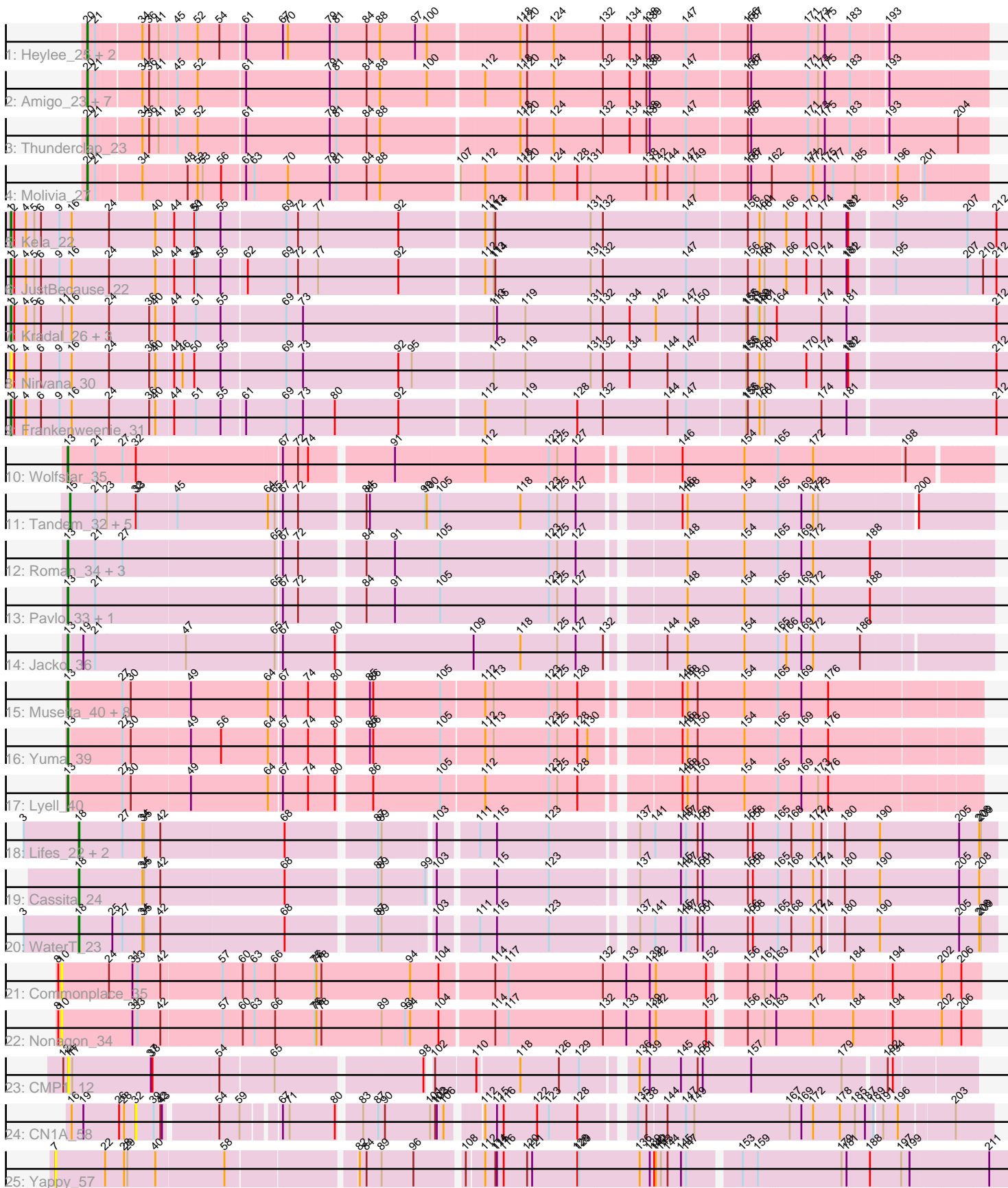


Pham 194041



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 194041 Report

This analysis was run 11/02/24 on database version 579.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 194041 has 56 members, 8 are drafts.

Phages represented in each track:

- Track 1 : Heylee\_25, Rings\_22, Amavida\_25
- Track 2 : Amigo\_23, Boersma\_24, Anansi\_23, Gorgeous\_23, Jaek\_22, Ichor\_22, Yeezus\_22, SorJuana\_23
- Track 3 : Thunderclap\_23
- Track 4 : Molivia\_27
- Track 5 : Kela\_22
- Track 6 : JustBecause\_22
- Track 7 : Kradal\_26, Quantum\_25, EhyElimayoE\_26, Satis\_26
- Track 8 : Nirvana\_30
- Track 9 : Frankenweenie\_31
- Track 10 : Wolfstar\_35
- Track 11 : Tandem\_32, Platte\_32, Hortus1\_32, Alleb\_33, OlinDD\_32, Pioneer3\_32
- Track 12 : Roman\_34, Hubbs\_34, Lupine\_33, PhillyPhilly\_34
- Track 13 : Pavlo\_33, DejaVu\_35
- Track 14 : Jacko\_36
- Track 15 : Musetta\_40, StevieWelch\_40, DustyDino\_43, Necrophoxinus\_42, RunningBrook\_42, Erenyeager\_40, Fork\_36, Welcome\_41, ASegato\_39
- Track 16 : Yuma\_39
- Track 17 : Lyell\_40
- Track 18 : Lifes\_22, LeeroyJenkins\_24, BarnCat\_20
- Track 19 : Cassita\_24
- Track 20 : WaterT\_23
- Track 21 : Commonplace\_35
- Track 22 : Nonagon\_34
- Track 23 : CMP1\_12
- Track 24 : CN1A\_58
- Track 25 : Yappy\_57

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

The start number called the most often in the published annotations is 13, it was called in 17 of the 48 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ASegato\_39, DejaVu\_35, DustyDino\_43, Erenyeager\_40, Fork\_36, Hubbs\_34, Jacko\_36, Lupine\_33, Lyell\_40, Musetta\_40, Necrophoxinus\_42, Pavlo\_33, PhillyPhilly\_34, Roman\_34, RunningBrook\_42, StevieWelch\_40, Welcome\_41, Wolfstar\_35, Yuma\_39,

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

- 

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

- Alleb\_33, Amavida\_25, Amigo\_23, Anansi\_23, BarnCat\_20, Boersma\_24, CMP1\_12, CN1A\_58, Cassita\_24, Commonplace\_35, EhyElimayoE\_26, Frankenweenie\_31, Gorgeous\_23, Heylee\_25, Hortus1\_32, Ichor\_22, Jaek\_22, JustBecause\_22, Kela\_22, Kradal\_26, LeeroyJenkins\_24, Lifes\_22, Molivia\_27, Nirvana\_30, Nonagon\_34, OlinDD\_32, Pioneer3\_32, Platte\_32, Quantum\_25, Rings\_22, Satis\_26, SorJuana\_23, Tandem\_32, Thunderclap\_23, WaterT\_23, Yappy\_57, Yeezus\_22,

### Summary by start number:

Start 1:

- Found in 8 of 56 ( 14.3% ) of genes in pham
- Manual Annotations of this start: 7 of 48
- Called 100.0% of time when present
- Phage (with cluster) where this start called: EhyElimayoE\_26 (BM), Frankenweenie\_31 (BM), JustBecause\_22 (BM), Kela\_22 (BM), Kradal\_26 (BM), Nirvana\_30 (BM), Quantum\_25 (BM), Satis\_26 (BM),

Start 7:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Yappy\_57 (singleton),

Start 10:

- Found in 2 of 56 ( 3.6% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Commonplace\_35 (JD), Nonagon\_34 (JD),

Start 13:

- Found in 19 of 56 ( 33.9% ) of genes in pham
- Manual Annotations of this start: 17 of 48
- Called 100.0% of time when present
- Phage (with cluster) where this start called: ASegato\_39 (ED2), DejaVu\_35 (ED1), DustyDino\_43 (ED2), Erenyeager\_40 (ED2), Fork\_36 (ED2), Hubbs\_34 (ED1), Jacko\_36 (ED1), Lupine\_33 (ED1), Lyell\_40 (ED2), Musetta\_40 (ED2), Necrophoxinus\_42 (ED2), Pavlo\_33 (ED1), PhillyPhilly\_34 (ED1), Roman\_34 (ED1), RunningBrook\_42 (ED2), StevieWelch\_40 (ED2), Welcome\_41 (ED2), Wolfstar\_35

(ED), Yuma\_39 (ED2),

Start 14:

- Found in 1 of 56 ( 1.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: CMP1\_12 (singleton),

Start 15:

- Found in 6 of 56 ( 10.7% ) of genes in pham
- Manual Annotations of this start: 6 of 48
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Alleb\_33 (ED1), Hortus1\_32 (ED1), OlinDD\_32 (ED1), Pioneer3\_32 (ED1), Platte\_32 (ED1), Tandem\_32 (ED1),

Start 18:

- Found in 5 of 56 ( 8.9% ) of genes in pham
- Manual Annotations of this start: 5 of 48
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BarnCat\_20 (GB), Cassita\_24 (GB), LeeroyJenkins\_24 (GB), Lifes\_22 (GB), WaterT\_23 (GB),

Start 20:

- Found in 13 of 56 ( 23.2% ) of genes in pham
- Manual Annotations of this start: 13 of 48
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amavida\_25 (AQ), Amigo\_23 (AQ), Anansi\_23 (AQ), Boersma\_24 (AQ), Gorgeous\_23 (AQ), Heylee\_25 (AQ), Ichor\_22 (AQ), Jaek\_22 (AQ), Molivia\_27 (AQ), Rings\_22 (AQ), SorJuana\_23 (AQ), Thunderclap\_23 (AQ), Yeezus\_22 (AQ),

Start 32:

- Found in 8 of 56 ( 14.3% ) of genes in pham
- No Manual Annotations of this start.
- Called 12.5% of time when present
- Phage (with cluster) where this start called: CN1A\_58 (singleton),

### **Summary by clusters:**

There are 8 clusters represented in this pham: AQ, singleton, BM, ED2, ED1, GB, ED, JD,

Info for manual annotations of cluster AQ:

- Start number 20 was manually annotated 13 times for cluster AQ.

Info for manual annotations of cluster BM:

- Start number 1 was manually annotated 7 times for cluster BM.

Info for manual annotations of cluster ED:

- Start number 13 was manually annotated 1 time for cluster ED.

Info for manual annotations of cluster ED1:

- Start number 13 was manually annotated 7 times for cluster ED1.

- Start number 15 was manually annotated 6 times for cluster ED1.

Info for manual annotations of cluster ED2:

- Start number 13 was manually annotated 9 times for cluster ED2.

Info for manual annotations of cluster GB:

- Start number 18 was manually annotated 5 times for cluster GB.

### **Gene Information:**

Gene: ASegato\_39 Start: 14663, Stop: 16192, Start Num: 13

Candidate Starts for ASegato\_39:

(Start: 13 @14663 has 17 MA's), (27, 14756), (30, 14771), (49, 14873), (64, 15011), (67, 15032), (74, 15077), (80, 15125), (85, 15170), (86, 15176), (105, 15296), (112, 15371), (113, 15386), (123, 15485), (125, 15500), (128, 15536), (146, 15686), (148, 15695), (150, 15713), (154, 15794), (165, 15854), (169, 15893), (176, 15941),

Gene: Alleb\_33 Start: 13165, Stop: 14715, Start Num: 15

Candidate Starts for Alleb\_33:

(Start: 15 @13165 has 6 MA's), (21, 13210), (23, 13231), (32, 13282), (33, 13285), (45, 13351), (64, 13513), (65, 13525), (67, 13534), (72, 13561), (84, 13666), (85, 13672), (99, 13771), (100, 13774), (105, 13795), (118, 13939), (123, 13990), (125, 14005), (127, 14038), (146, 14191), (148, 14200), (154, 14299), (165, 14359), (169, 14398), (172, 14419), (173, 14428), (200, 14590),

Gene: Amavida\_25 Start: 10314, Stop: 11843, Start Num: 20

Candidate Starts for Amavida\_25:

(Start: 20 @10314 has 13 MA's), (21, 10326), (34, 10401), (36, 10413), (41, 10428), (45, 10458), (52, 10491), (54, 10530), (61, 10569), (67, 10635), (70, 10644), (79, 10719), (81, 10731), (84, 10785), (88, 10806), (97, 10869), (100, 10890), (118, 11043), (120, 11055), (124, 11103), (132, 11190), (134, 11238), (138, 11268), (139, 11274), (147, 11337), (156, 11442), (157, 11448), (171, 11547), (173, 11565), (175, 11577), (183, 11622), (193, 11679),

Gene: Amigo\_23 Start: 10188, Stop: 11717, Start Num: 20

Candidate Starts for Amigo\_23:

(Start: 20 @10188 has 13 MA's), (21, 10200), (34, 10275), (36, 10287), (41, 10302), (45, 10332), (52, 10365), (61, 10443), (79, 10593), (81, 10605), (84, 10659), (88, 10680), (100, 10764), (112, 10854), (118, 10917), (120, 10929), (124, 10977), (132, 11064), (134, 11112), (138, 11142), (139, 11148), (147, 11211), (156, 11316), (157, 11322), (171, 11421), (173, 11439), (175, 11451), (183, 11496), (193, 11553),

Gene: Anansi\_23 Start: 10197, Stop: 11726, Start Num: 20

Candidate Starts for Anansi\_23:

(Start: 20 @10197 has 13 MA's), (21, 10209), (34, 10284), (36, 10296), (41, 10311), (45, 10341), (52, 10374), (61, 10452), (79, 10602), (81, 10614), (84, 10668), (88, 10689), (100, 10773), (112, 10863), (118, 10926), (120, 10938), (124, 10986), (132, 11073), (134, 11121), (138, 11151), (139, 11157), (147, 11220), (156, 11325), (157, 11331), (171, 11430), (173, 11448), (175, 11460), (183, 11505), (193, 11562),

Gene: BarnCat\_20 Start: 8100, Stop: 9647, Start Num: 18

Candidate Starts for BarnCat\_20:

(3, 8001), (Start: 18 @8100 has 5 MA's), (27, 8178), (34, 8211), (35, 8214), (42, 8241), (68, 8460), (87, 8607), (89, 8613), (103, 8697), (111, 8760), (115, 8790), (123, 8883), (137, 9015), (141, 9042), (145, 9087), (147, 9096), (150, 9117), (151, 9126), (156, 9207), (158, 9216), (165, 9261), (168, 9285), (172, 9324), (174, 9339), (180, 9375), (190, 9438), (205, 9579), (208, 9615), (209, 9618),

Gene: Boersma\_24 Start: 10188, Stop: 11717, Start Num: 20

Candidate Starts for Boersma\_24:

(Start: 20 @10188 has 13 MA's), (21, 10200), (34, 10275), (36, 10287), (41, 10302), (45, 10332), (52, 10365), (61, 10443), (79, 10593), (81, 10605), (84, 10659), (88, 10680), (100, 10764), (112, 10854), (118, 10917), (120, 10929), (124, 10977), (132, 11064), (134, 11112), (138, 11142), (139, 11148), (147, 11211), (156, 11316), (157, 11322), (171, 11421), (173, 11439), (175, 11451), (183, 11496), (193, 11553),

Gene: CMP1\_12 Start: 8832, Stop: 10340, Start Num: 14

Candidate Starts for CMP1\_12:

(12, 8823), (14, 8832), (17, 8838), (37, 8979), (38, 8982), (54, 9099), (65, 9192), (98, 9435), (102, 9441), (110, 9510), (118, 9582), (126, 9651), (129, 9687), (136, 9765), (139, 9783), (145, 9837), (150, 9867), (151, 9876), (157, 9963), (179, 10125), (192, 10194), (194, 10203),

Gene: CN1A\_58 Start: 46863, Stop: 45484, Start Num: 32

Candidate Starts for CN1A\_58:

(16, 46977), (19, 46956), (26, 46893), (28, 46884), (32, 46863), (39, 46833), (42, 46821), (43, 46818), (54, 46731), (59, 46695), (67, 46641), (71, 46629), (80, 46548), (83, 46515), (87, 46491), (90, 46479), (101, 46398), (102, 46392), (103, 46389), (106, 46377), (112, 46329), (115, 46308), (116, 46296), (122, 46236), (123, 46215), (128, 46164), (135, 46086), (138, 46074), (144, 46041), (147, 46008), (149, 45993), (167, 45822), (169, 45801), (172, 45780), (178, 45732), (185, 45705), (187, 45687), (189, 45672), (191, 45660), (196, 45636), (203, 45546),

Gene: Cassita\_24 Start: 8661, Stop: 10208, Start Num: 18

Candidate Starts for Cassita\_24:

(Start: 18 @8661 has 5 MA's), (34, 8772), (35, 8775), (42, 8802), (68, 9021), (87, 9168), (89, 9174), (99, 9249), (103, 9258), (115, 9351), (123, 9444), (137, 9576), (145, 9648), (147, 9657), (150, 9678), (151, 9687), (156, 9768), (158, 9777), (165, 9822), (168, 9846), (172, 9885), (174, 9900), (180, 9936), (190, 9999), (205, 10140), (208, 10176),

Gene: Commonplace\_35 Start: 15291, Stop: 16868, Start Num: 10

Candidate Starts for Commonplace\_35:

(8, 15285), (10, 15291), (24, 15375), (31, 15417), (33, 15426), (42, 15465), (57, 15570), (60, 15603), (63, 15624), (66, 15660), (75, 15729), (76, 15732), (78, 15741), (94, 15900), (104, 15951), (114, 16041), (117, 16065), (132, 16233), (133, 16275), (139, 16317), (142, 16326), (152, 16416), (156, 16470), (161, 16500), (163, 16521), (172, 16587), (184, 16659), (194, 16722), (202, 16803), (206, 16833),

Gene: DejaVu\_35 Start: 13501, Stop: 15063, Start Num: 13

Candidate Starts for DejaVu\_35:

(Start: 13 @13501 has 17 MA's), (21, 13549), (65, 13864), (67, 13873), (72, 13900), (84, 14005), (91, 14056), (105, 14134), (123, 14329), (125, 14344), (127, 14377), (148, 14539), (154, 14638), (165, 14698), (169, 14737), (172, 14758), (188, 14860),

Gene: DustyDino\_43 Start: 15611, Stop: 17131, Start Num: 13

Candidate Starts for DustyDino\_43:

(Start: 13 @15611 has 17 MA's), (27, 15704), (30, 15719), (49, 15821), (64, 15959), (67, 15980), (74, 16025), (80, 16073), (85, 16118), (86, 16124), (105, 16244), (112, 16319), (113, 16334), (123, 16433),

(125, 16448), (128, 16484), (146, 16634), (148, 16643), (150, 16661), (154, 16742), (165, 16802), (169, 16841), (176, 16889),

Gene: EhyElimayoE\_26 Start: 13508, Stop: 15238, Start Num: 1

Candidate Starts for EhyElimayoE\_26:

(Start: 1 @13508 has 7 MA's), (2, 13514), (4, 13535), (5, 13550), (6, 13562), (11, 13601), (16, 13616), (24, 13682), (36, 13754), (40, 13763), (44, 13793), (51, 13832), (55, 13874), (69, 13985), (73, 14015), (113, 14336), (115, 14342), (119, 14393), (131, 14510), (132, 14531), (134, 14579), (142, 14624), (147, 14675), (150, 14696), (155, 14777), (156, 14780), (159, 14798), (160, 14801), (161, 14810), (164, 14831), (174, 14909), (181, 14954), (212, 15203),

Gene: Erenyeager\_40 Start: 15006, Stop: 16526, Start Num: 13

Candidate Starts for Erenyeager\_40:

(Start: 13 @15006 has 17 MA's), (27, 15099), (30, 15114), (49, 15216), (64, 15354), (67, 15375), (74, 15420), (80, 15468), (85, 15513), (86, 15519), (105, 15639), (112, 15714), (113, 15729), (123, 15828), (125, 15843), (128, 15879), (146, 16029), (148, 16038), (150, 16056), (154, 16137), (165, 16197), (169, 16236), (176, 16284),

Gene: Fork\_36 Start: 14321, Stop: 15841, Start Num: 13

Candidate Starts for Fork\_36:

(Start: 13 @14321 has 17 MA's), (27, 14414), (30, 14429), (49, 14531), (64, 14669), (67, 14690), (74, 14735), (80, 14783), (85, 14828), (86, 14834), (105, 14954), (112, 15029), (113, 15044), (123, 15143), (125, 15158), (128, 15194), (146, 15344), (148, 15353), (150, 15371), (154, 15452), (165, 15512), (169, 15551), (176, 15599),

Gene: Frankenweenie\_31 Start: 15404, Stop: 17143, Start Num: 1

Candidate Starts for Frankenweenie\_31:

(Start: 1 @15404 has 7 MA's), (2, 15410), (4, 15431), (6, 15458), (9, 15491), (16, 15512), (24, 15578), (36, 15650), (40, 15659), (44, 15689), (51, 15728), (55, 15770), (61, 15809), (69, 15881), (73, 15911), (80, 15968), (92, 16079), (112, 16217), (119, 16289), (128, 16382), (132, 16427), (144, 16538), (147, 16571), (155, 16673), (156, 16676), (160, 16697), (161, 16706), (174, 16805), (181, 16850), (212, 17099),

Gene: Gorgeous\_23 Start: 10197, Stop: 11726, Start Num: 20

Candidate Starts for Gorgeous\_23:

(Start: 20 @10197 has 13 MA's), (21, 10209), (34, 10284), (36, 10296), (41, 10311), (45, 10341), (52, 10374), (61, 10452), (79, 10602), (81, 10614), (84, 10668), (88, 10689), (100, 10773), (112, 10863), (118, 10926), (120, 10938), (124, 10986), (132, 11073), (134, 11121), (138, 11151), (139, 11157), (147, 11220), (156, 11325), (157, 11331), (171, 11430), (173, 11448), (175, 11460), (183, 11505), (193, 11562),

Gene: Heylee\_25 Start: 10314, Stop: 11843, Start Num: 20

Candidate Starts for Heylee\_25:

(Start: 20 @10314 has 13 MA's), (21, 10326), (34, 10401), (36, 10413), (41, 10428), (45, 10458), (52, 10491), (54, 10530), (61, 10569), (67, 10635), (70, 10644), (79, 10719), (81, 10731), (84, 10785), (88, 10806), (97, 10869), (100, 10890), (118, 11043), (120, 11055), (124, 11103), (132, 11190), (134, 11238), (138, 11268), (139, 11274), (147, 11337), (156, 11442), (157, 11448), (171, 11547), (173, 11565), (175, 11577), (183, 11622), (193, 11679),

Gene: Hortus1\_32 Start: 13179, Stop: 14729, Start Num: 15

Candidate Starts for Hortus1\_32:

(Start: 15 @13179 has 6 MA's), (21, 13224), (23, 13245), (32, 13296), (33, 13299), (45, 13365), (64, 13527), (65, 13539), (67, 13548), (72, 13575), (84, 13680), (85, 13686), (99, 13785), (100, 13788),

(105, 13809), (118, 13953), (123, 14004), (125, 14019), (127, 14052), (146, 14205), (148, 14214), (154, 14313), (165, 14373), (169, 14412), (172, 14433), (173, 14442), (200, 14604),

Gene: Hubbs\_34 Start: 13713, Stop: 15275, Start Num: 13

Candidate Starts for Hubbs\_34:

(Start: 13 @13713 has 17 MA's), (21, 13761), (27, 13809), (65, 14076), (67, 14085), (72, 14112), (84, 14217), (91, 14268), (105, 14346), (123, 14541), (125, 14556), (127, 14589), (148, 14751), (154, 14850), (165, 14910), (169, 14949), (172, 14970), (188, 15072),

Gene: Ichor\_22 Start: 10188, Stop: 11717, Start Num: 20

Candidate Starts for Ichor\_22:

(Start: 20 @10188 has 13 MA's), (21, 10200), (34, 10275), (36, 10287), (41, 10302), (45, 10332), (52, 10365), (61, 10443), (79, 10593), (81, 10605), (84, 10659), (88, 10680), (100, 10764), (112, 10854), (118, 10917), (120, 10929), (124, 10977), (132, 11064), (134, 11112), (138, 11142), (139, 11148), (147, 11211), (156, 11316), (157, 11322), (171, 11421), (173, 11439), (175, 11451), (183, 11496), (193, 11553),

Gene: Jacko\_36 Start: 13698, Stop: 15251, Start Num: 13

Candidate Starts for Jacko\_36:

(Start: 13 @13698 has 17 MA's), (19, 13722), (21, 13743), (47, 13899), (65, 14058), (67, 14067), (80, 14160), (109, 14391), (118, 14475), (125, 14541), (127, 14574), (132, 14622), (144, 14700), (148, 14736), (154, 14835), (165, 14895), (166, 14907), (169, 14934), (172, 14955), (186, 15039),

Gene: Jaek\_22 Start: 10188, Stop: 11717, Start Num: 20

Candidate Starts for Jaek\_22:

(Start: 20 @10188 has 13 MA's), (21, 10200), (34, 10275), (36, 10287), (41, 10302), (45, 10332), (52, 10365), (61, 10443), (79, 10593), (81, 10605), (84, 10659), (88, 10680), (100, 10764), (112, 10854), (118, 10917), (120, 10929), (124, 10977), (132, 11064), (134, 11112), (138, 11142), (139, 11148), (147, 11211), (156, 11316), (157, 11322), (171, 11421), (173, 11439), (175, 11451), (183, 11496), (193, 11553),

Gene: JustBecause\_22 Start: 12250, Stop: 13989, Start Num: 1

Candidate Starts for JustBecause\_22:

(Start: 1 @12250 has 7 MA's), (2, 12256), (4, 12277), (5, 12292), (6, 12304), (9, 12337), (16, 12358), (24, 12424), (40, 12505), (44, 12535), (50, 12571), (51, 12574), (55, 12616), (62, 12658), (69, 12727), (72, 12748), (77, 12784), (92, 12925), (112, 13063), (113, 13078), (114, 13081), (131, 13252), (132, 13273), (147, 13417), (156, 13522), (160, 13543), (161, 13552), (166, 13588), (170, 13624), (174, 13651), (181, 13696), (182, 13699), (195, 13771), (207, 13894), (210, 13921), (212, 13945),

Gene: Kela\_22 Start: 12241, Stop: 13980, Start Num: 1

Candidate Starts for Kela\_22:

(Start: 1 @12241 has 7 MA's), (2, 12247), (4, 12268), (5, 12283), (6, 12295), (9, 12328), (16, 12349), (24, 12415), (40, 12496), (44, 12526), (50, 12562), (51, 12565), (55, 12607), (69, 12718), (72, 12739), (77, 12775), (92, 12916), (112, 13054), (113, 13069), (114, 13072), (131, 13243), (132, 13264), (147, 13408), (156, 13513), (160, 13534), (161, 13543), (166, 13579), (170, 13615), (174, 13642), (181, 13687), (182, 13690), (195, 13762), (207, 13885), (212, 13936),

Gene: Kradal\_26 Start: 13508, Stop: 15238, Start Num: 1

Candidate Starts for Kradal\_26:

(Start: 1 @13508 has 7 MA's), (2, 13514), (4, 13535), (5, 13550), (6, 13562), (11, 13601), (16, 13616), (24, 13682), (36, 13754), (40, 13763), (44, 13793), (51, 13832), (55, 13874), (69, 13985), (73, 14015), (113, 14336), (115, 14342), (119, 14393), (131, 14510), (132, 14531), (134, 14579), (142, 14624), (147, 14675), (150, 14696), (155, 14777), (156, 14780), (159, 14798), (160, 14801), (161, 14810),



(164, 14831), (174, 14909), (181, 14954), (212, 15203),

Gene: LeeroyJenkins\_24 Start: 8579, Stop: 10126, Start Num: 18

Candidate Starts for LeeroyJenkins\_24:

(3, 8480), (Start: 18 @8579 has 5 MA's), (27, 8657), (34, 8690), (35, 8693), (42, 8720), (68, 8939), (87, 9086), (89, 9092), (103, 9176), (111, 9239), (115, 9269), (123, 9362), (137, 9494), (141, 9521), (145, 9566), (147, 9575), (150, 9596), (151, 9605), (156, 9686), (158, 9695), (165, 9740), (168, 9764), (172, 9803), (174, 9818), (180, 9854), (190, 9917), (205, 10058), (208, 10094), (209, 10097),

Gene: Lifes\_22 Start: 8131, Stop: 9678, Start Num: 18

Candidate Starts for Lifes\_22:

(3, 8032), (Start: 18 @8131 has 5 MA's), (27, 8209), (34, 8242), (35, 8245), (42, 8272), (68, 8491), (87, 8638), (89, 8644), (103, 8728), (111, 8791), (115, 8821), (123, 8914), (137, 9046), (141, 9073), (145, 9118), (147, 9127), (150, 9148), (151, 9157), (156, 9238), (158, 9247), (165, 9292), (168, 9316), (172, 9355), (174, 9370), (180, 9406), (190, 9469), (205, 9610), (208, 9646), (209, 9649),

Gene: Lupine\_33 Start: 13385, Stop: 14947, Start Num: 13

Candidate Starts for Lupine\_33:

(Start: 13 @13385 has 17 MA's), (21, 13433), (27, 13481), (65, 13748), (67, 13757), (72, 13784), (84, 13889), (91, 13940), (105, 14018), (123, 14213), (125, 14228), (127, 14261), (148, 14423), (154, 14522), (165, 14582), (169, 14621), (172, 14642), (188, 14744),

Gene: Lyell\_40 Start: 14924, Stop: 16453, Start Num: 13

Candidate Starts for Lyell\_40:

(Start: 13 @14924 has 17 MA's), (27, 15017), (30, 15032), (49, 15134), (64, 15272), (67, 15293), (74, 15338), (80, 15386), (86, 15437), (105, 15557), (112, 15632), (123, 15746), (125, 15761), (128, 15797), (146, 15947), (148, 15956), (150, 15974), (154, 16055), (165, 16115), (169, 16154), (173, 16184), (176, 16202),

Gene: Molivia\_27 Start: 10483, Stop: 12003, Start Num: 20

Candidate Starts for Molivia\_27:

(Start: 20 @10483 has 13 MA's), (21, 10495), (34, 10570), (48, 10645), (52, 10660), (53, 10669), (56, 10702), (61, 10738), (63, 10753), (70, 10813), (79, 10888), (81, 10900), (84, 10954), (88, 10975), (107, 11107), (112, 11146), (118, 11209), (120, 11221), (124, 11269), (128, 11311), (131, 11335), (138, 11434), (142, 11449), (144, 11470), (147, 11503), (149, 11518), (156, 11608), (157, 11614), (162, 11650), (171, 11713), (172, 11722), (175, 11743), (177, 11758), (185, 11797), (196, 11860), (201, 11899),

Gene: Musetta\_40 Start: 15031, Stop: 16560, Start Num: 13

Candidate Starts for Musetta\_40:

(Start: 13 @15031 has 17 MA's), (27, 15124), (30, 15139), (49, 15241), (64, 15379), (67, 15400), (74, 15445), (80, 15493), (85, 15538), (86, 15544), (105, 15664), (112, 15739), (113, 15754), (123, 15853), (125, 15868), (128, 15904), (146, 16054), (148, 16063), (150, 16081), (154, 16162), (165, 16222), (169, 16261), (176, 16309),

Gene: Necrophoxinus\_42 Start: 15619, Stop: 17139, Start Num: 13

Candidate Starts for Necrophoxinus\_42:

(Start: 13 @15619 has 17 MA's), (27, 15712), (30, 15727), (49, 15829), (64, 15967), (67, 15988), (74, 16033), (80, 16081), (85, 16126), (86, 16132), (105, 16252), (112, 16327), (113, 16342), (123, 16441), (125, 16456), (128, 16492), (146, 16642), (148, 16651), (150, 16669), (154, 16750), (165, 16810), (169, 16849), (176, 16897),

Gene: Nirvana\_30 Start: 15604, Stop: 17343, Start Num: 1

Candidate Starts for Nirvana\_30:

(Start: 1 @15604 has 7 MA's), (2, 15610), (4, 15631), (6, 15658), (9, 15691), (16, 15712), (24, 15778), (36, 15850), (40, 15859), (44, 15889), (46, 15904), (50, 15925), (55, 15970), (69, 16081), (73, 16111), (92, 16279), (95, 16300), (113, 16432), (119, 16489), (131, 16606), (132, 16627), (134, 16675), (144, 16738), (147, 16771), (155, 16873), (156, 16876), (160, 16897), (161, 16906), (170, 16978), (174, 17005), (181, 17050), (182, 17053), (212, 17299),

Gene: Nonagon\_34 Start: 14950, Stop: 16527, Start Num: 10

Candidate Starts for Nonagon\_34:

(8, 14944), (10, 14950), (31, 15076), (33, 15085), (42, 15124), (57, 15229), (60, 15262), (63, 15283), (66, 15319), (75, 15388), (76, 15391), (78, 15400), (89, 15508), (93, 15550), (94, 15559), (104, 15610), (114, 15700), (117, 15724), (132, 15892), (133, 15934), (139, 15976), (142, 15985), (152, 16075), (156, 16129), (161, 16159), (163, 16180), (172, 16246), (184, 16318), (194, 16381), (202, 16462), (206, 16492),

Gene: OlinDD\_32 Start: 13178, Stop: 14728, Start Num: 15

Candidate Starts for OlinDD\_32:

(Start: 15 @13178 has 6 MA's), (21, 13223), (23, 13244), (32, 13295), (33, 13298), (45, 13364), (64, 13526), (65, 13538), (67, 13547), (72, 13574), (84, 13679), (85, 13685), (99, 13784), (100, 13787), (105, 13808), (118, 13952), (123, 14003), (125, 14018), (127, 14051), (146, 14204), (148, 14213), (154, 14312), (165, 14372), (169, 14411), (172, 14432), (173, 14441), (200, 14603),

Gene: Pavlo\_33 Start: 13660, Stop: 15222, Start Num: 13

Candidate Starts for Pavlo\_33:

(Start: 13 @13660 has 17 MA's), (21, 13708), (65, 14023), (67, 14032), (72, 14059), (84, 14164), (91, 14215), (105, 14293), (123, 14488), (125, 14503), (127, 14536), (148, 14698), (154, 14797), (165, 14857), (169, 14896), (172, 14917), (188, 15019),

Gene: PhillyPhilly\_34 Start: 13565, Stop: 15127, Start Num: 13

Candidate Starts for PhillyPhilly\_34:

(Start: 13 @13565 has 17 MA's), (21, 13613), (27, 13661), (65, 13928), (67, 13937), (72, 13964), (84, 14069), (91, 14120), (105, 14198), (123, 14393), (125, 14408), (127, 14441), (148, 14603), (154, 14702), (165, 14762), (169, 14801), (172, 14822), (188, 14924),

Gene: Pioneer3\_32 Start: 13162, Stop: 14712, Start Num: 15

Candidate Starts for Pioneer3\_32:

(Start: 15 @13162 has 6 MA's), (21, 13207), (23, 13228), (32, 13279), (33, 13282), (45, 13348), (64, 13510), (65, 13522), (67, 13531), (72, 13558), (84, 13663), (85, 13669), (99, 13768), (100, 13771), (105, 13792), (118, 13936), (123, 13987), (125, 14002), (127, 14035), (146, 14188), (148, 14197), (154, 14296), (165, 14356), (169, 14395), (172, 14416), (173, 14425), (200, 14587),

Gene: Platte\_32 Start: 12947, Stop: 14497, Start Num: 15

Candidate Starts for Platte\_32:

(Start: 15 @12947 has 6 MA's), (21, 12992), (23, 13013), (32, 13064), (33, 13067), (45, 13133), (64, 13295), (65, 13307), (67, 13316), (72, 13343), (84, 13448), (85, 13454), (99, 13553), (100, 13556), (105, 13577), (118, 13721), (123, 13772), (125, 13787), (127, 13820), (146, 13973), (148, 13982), (154, 14081), (165, 14141), (169, 14180), (172, 14201), (173, 14210), (200, 14372),

Gene: Quantum\_25 Start: 13508, Stop: 15238, Start Num: 1

Candidate Starts for Quantum\_25:

(Start: 1 @13508 has 7 MA's), (2, 13514), (4, 13535), (5, 13550), (6, 13562), (11, 13601), (16, 13616), (24, 13682), (36, 13754), (40, 13763), (44, 13793), (51, 13832), (55, 13874), (69, 13985), (73, 14015), (113, 14336), (115, 14342), (119, 14393), (131, 14510), (132, 14531), (134, 14579), (142, 14624),

(147, 14675), (150, 14696), (155, 14777), (156, 14780), (159, 14798), (160, 14801), (161, 14810), (164, 14831), (174, 14909), (181, 14954), (212, 15203),

Gene: Rings\_22 Start: 10319, Stop: 11848, Start Num: 20

Candidate Starts for Rings\_22:

(Start: 20 @10319 has 13 MA's), (21, 10331), (34, 10406), (36, 10418), (41, 10433), (45, 10463), (52, 10496), (54, 10535), (61, 10574), (67, 10640), (70, 10649), (79, 10724), (81, 10736), (84, 10790), (88, 10811), (97, 10874), (100, 10895), (118, 11048), (120, 11060), (124, 11108), (132, 11195), (134, 11243), (138, 11273), (139, 11279), (147, 11342), (156, 11447), (157, 11453), (171, 11552), (173, 11570), (175, 11582), (183, 11627), (193, 11684),

Gene: Roman\_34 Start: 13560, Stop: 15122, Start Num: 13

Candidate Starts for Roman\_34:

(Start: 13 @13560 has 17 MA's), (21, 13608), (27, 13656), (65, 13923), (67, 13932), (72, 13959), (84, 14064), (91, 14115), (105, 14193), (123, 14388), (125, 14403), (127, 14436), (148, 14598), (154, 14697), (165, 14757), (169, 14796), (172, 14817), (188, 14919),

Gene: RunningBrook\_42 Start: 15611, Stop: 17131, Start Num: 13

Candidate Starts for RunningBrook\_42:

(Start: 13 @15611 has 17 MA's), (27, 15704), (30, 15719), (49, 15821), (64, 15959), (67, 15980), (74, 16025), (80, 16073), (85, 16118), (86, 16124), (105, 16244), (112, 16319), (113, 16334), (123, 16433), (125, 16448), (128, 16484), (146, 16634), (148, 16643), (150, 16661), (154, 16742), (165, 16802), (169, 16841), (176, 16889),

Gene: Satis\_26 Start: 13504, Stop: 15234, Start Num: 1

Candidate Starts for Satis\_26:

(Start: 1 @13504 has 7 MA's), (2, 13510), (4, 13531), (5, 13546), (6, 13558), (11, 13597), (16, 13612), (24, 13678), (36, 13750), (40, 13759), (44, 13789), (51, 13828), (55, 13870), (69, 13981), (73, 14011), (113, 14332), (115, 14338), (119, 14389), (131, 14506), (132, 14527), (134, 14575), (142, 14620), (147, 14671), (150, 14692), (155, 14773), (156, 14776), (159, 14794), (160, 14797), (161, 14806), (164, 14827), (174, 14905), (181, 14950), (212, 15199),

Gene: SorJuana\_23 Start: 10197, Stop: 11726, Start Num: 20

Candidate Starts for SorJuana\_23:

(Start: 20 @10197 has 13 MA's), (21, 10209), (34, 10284), (36, 10296), (41, 10311), (45, 10341), (52, 10374), (61, 10452), (79, 10602), (81, 10614), (84, 10668), (88, 10689), (100, 10773), (112, 10863), (118, 10926), (120, 10938), (124, 10986), (132, 11073), (134, 11121), (138, 11151), (139, 11157), (147, 11220), (156, 11325), (157, 11331), (171, 11430), (173, 11448), (175, 11460), (183, 11505), (193, 11562),

Gene: StevieWelch\_40 Start: 15011, Stop: 16531, Start Num: 13

Candidate Starts for StevieWelch\_40:

(Start: 13 @15011 has 17 MA's), (27, 15104), (30, 15119), (49, 15221), (64, 15359), (67, 15380), (74, 15425), (80, 15473), (85, 15518), (86, 15524), (105, 15644), (112, 15719), (113, 15734), (123, 15833), (125, 15848), (128, 15884), (146, 16034), (148, 16043), (150, 16061), (154, 16142), (165, 16202), (169, 16241), (176, 16289),

Gene: Tandem\_32 Start: 13101, Stop: 14651, Start Num: 15

Candidate Starts for Tandem\_32:

(Start: 15 @13101 has 6 MA's), (21, 13146), (23, 13167), (32, 13218), (33, 13221), (45, 13287), (64, 13449), (65, 13461), (67, 13470), (72, 13497), (84, 13602), (85, 13608), (99, 13707), (100, 13710), (105, 13731), (118, 13875), (123, 13926), (125, 13941), (127, 13974), (146, 14127), (148, 14136), (154, 14235), (165, 14295), (169, 14334), (172, 14355), (173, 14364), (200, 14526),

Gene: Thunderclap\_23 Start: 10218, Stop: 11747, Start Num: 20

Candidate Starts for Thunderclap\_23:

(Start: 20 @10218 has 13 MA's), (21, 10230), (34, 10305), (36, 10317), (41, 10332), (45, 10362), (52, 10395), (61, 10473), (79, 10623), (81, 10635), (84, 10689), (88, 10710), (118, 10947), (120, 10959), (124, 11007), (132, 11094), (134, 11142), (138, 11172), (139, 11178), (147, 11241), (156, 11346), (157, 11352), (171, 11451), (173, 11469), (175, 11481), (183, 11526), (193, 11583), (204, 11697),

Gene: WaterT\_23 Start: 8405, Stop: 9952, Start Num: 18

Candidate Starts for WaterT\_23:

(3, 8306), (Start: 18 @8405 has 5 MA's), (25, 8465), (27, 8483), (34, 8516), (35, 8519), (42, 8546), (68, 8765), (87, 8912), (89, 8918), (103, 9002), (111, 9065), (115, 9095), (123, 9188), (137, 9320), (141, 9347), (145, 9392), (147, 9401), (150, 9422), (151, 9431), (156, 9512), (158, 9521), (165, 9566), (168, 9590), (172, 9629), (174, 9644), (180, 9680), (190, 9743), (205, 9884), (208, 9920), (209, 9923),

Gene: Welcome\_41 Start: 15028, Stop: 16548, Start Num: 13

Candidate Starts for Welcome\_41:

(Start: 13 @15028 has 17 MA's), (27, 15121), (30, 15136), (49, 15238), (64, 15376), (67, 15397), (74, 15442), (80, 15490), (85, 15535), (86, 15541), (105, 15661), (112, 15736), (113, 15751), (123, 15850), (125, 15865), (128, 15901), (146, 16051), (148, 16060), (150, 16078), (154, 16159), (165, 16219), (169, 16258), (176, 16306),

Gene: Wolfstar\_35 Start: 13966, Stop: 15513, Start Num: 13

Candidate Starts for Wolfstar\_35:

(Start: 13 @13966 has 17 MA's), (21, 14014), (27, 14062), (32, 14086), (67, 14335), (72, 14362), (74, 14380), (91, 14518), (112, 14677), (123, 14791), (125, 14806), (127, 14839), (146, 14992), (154, 15100), (165, 15160), (172, 15220), (198, 15376),

Gene: Yappy\_57 Start: 16169, Stop: 17779, Start Num: 7

Candidate Starts for Yappy\_57:

(7, 16169), (22, 16256), (28, 16289), (29, 16295), (40, 16343), (58, 16463), (82, 16673), (84, 16685), (89, 16709), (96, 16766), (108, 16844), (112, 16868), (114, 16886), (115, 16889), (116, 16901), (120, 16943), (121, 16952), (128, 17033), (129, 17036), (136, 17144), (139, 17162), (140, 17168), (142, 17171), (143, 17180), (144, 17192), (145, 17216), (147, 17225), (153, 17309), (159, 17336), (179, 17480), (181, 17489), (188, 17531), (197, 17585), (199, 17597), (211, 17726),

Gene: Yeezus\_22 Start: 10187, Stop: 11716, Start Num: 20

Candidate Starts for Yeezus\_22:

(Start: 20 @10187 has 13 MA's), (21, 10199), (34, 10274), (36, 10286), (41, 10301), (45, 10331), (52, 10364), (61, 10442), (79, 10592), (81, 10604), (84, 10658), (88, 10679), (100, 10763), (112, 10853), (118, 10916), (120, 10928), (124, 10976), (132, 11063), (134, 11111), (138, 11141), (139, 11147), (147, 11210), (156, 11315), (157, 11321), (171, 11420), (173, 11438), (175, 11450), (183, 11495), (193, 11552),

Gene: Yuma\_39 Start: 14930, Stop: 16459, Start Num: 13

Candidate Starts for Yuma\_39:

(Start: 13 @14930 has 17 MA's), (27, 15023), (30, 15038), (49, 15140), (56, 15194), (64, 15278), (67, 15299), (74, 15344), (80, 15392), (85, 15437), (86, 15443), (105, 15563), (112, 15638), (113, 15653), (123, 15752), (125, 15767), (128, 15803), (130, 15821), (146, 15953), (148, 15962), (150, 15980), (154, 16061), (165, 16121), (169, 16160), (176, 16208),