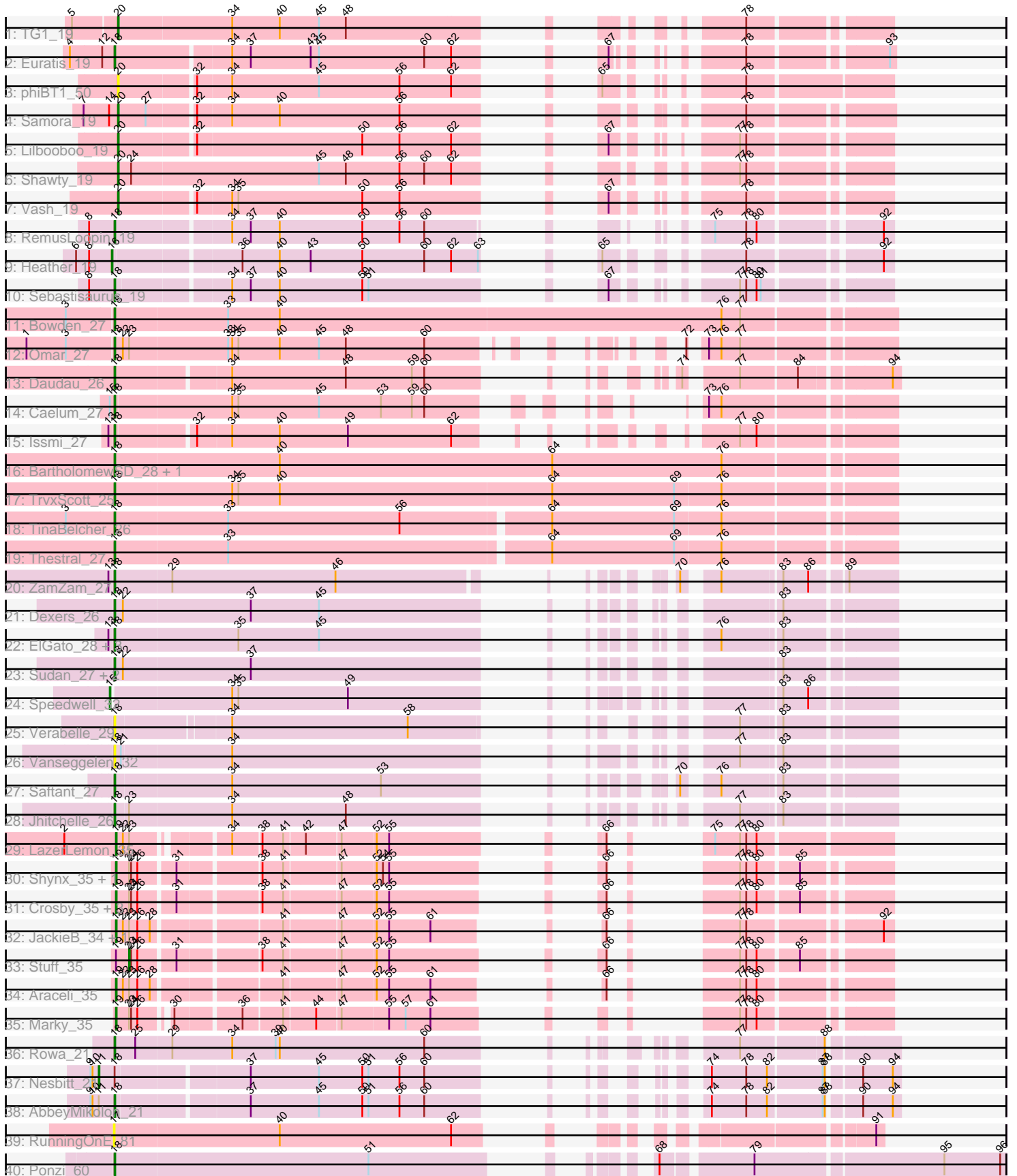


Pham 308717



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 308717 Report

This analysis was run 06/27/26 on database version 652.

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 308717 has 51 members, 4 are drafts.

Phages represented in each track:

- Track 1 : TG1\_19
- Track 2 : Euratis\_19
- Track 3 : phiBT1\_50
- Track 4 : Samora\_19
- Track 5 : Lilbooboo\_19
- Track 6 : Shawty\_19
- Track 7 : Vash\_19
- Track 8 : RemusLoopin\_19
- Track 9 : Heather\_19
- Track 10 : Sebastisaurus\_19
- Track 11 : Bowden\_27
- Track 12 : Omar\_27
- Track 13 : Daudau\_26
- Track 14 : Caelum\_27
- Track 15 : Issmi\_27
- Track 16 : BartholomewSD\_28, Alvy\_28
- Track 17 : TrvxScott\_25
- Track 18 : TinaBelcher\_26
- Track 19 : Thestral\_27
- Track 20 : ZamZam\_27
- Track 21 : Dexers\_26
- Track 22 : ElGato\_28, Pavo\_28, Provolone\_28, Conan\_28
- Track 23 : Sudan\_27, Alsaber\_28, Kaine\_27
- Track 24 : Speedwell\_32
- Track 25 : Verabelle\_29
- Track 26 : Vanseggelen\_32
- Track 27 : Saftant\_27
- Track 28 : Jhitchelle\_26
- Track 29 : LazerLemon\_35
- Track 30 : Shynx\_35, Intolerant\_34
- Track 31 : Crosby\_35, Microdon\_34, Bogota\_35, UNTPL\_35
- Track 32 : JackieB\_34, Henoccus\_35
- Track 33 : Stuff\_35

- Track 34 : Araceli\_35
- Track 35 : Marky\_35
- Track 36 : Rowa\_21
- Track 37 : Nesbitt\_21
- Track 38 : AbbeyMikolon\_21
- Track 39 : RunningOnE\_81
- Track 40 : Ponzi\_60

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

The start number called the most often in the published annotations is 18, it was called in 27 of the 47 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- AbbeyMikolon\_21, Alsaber\_28, Alvy\_28, BartholomewSD\_28, Bowden\_27, Caelum\_27, Conan\_28, Daudau\_26, Dexers\_26, ElGato\_28, Euratis\_19, Issmi\_27, Jhitchelle\_26, Kaine\_27, Omar\_27, Pavo\_28, Ponzi\_60, Provolone\_28, RemusLoopin\_19, Rowa\_21, Saftant\_27, Sebastisaurus\_19, Sudan\_27, Thestral\_27, TinaBelcher\_26, TrvxScott\_25, Vanseggelen\_32, Verabelle\_29, ZamZam\_27,

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

- Nesbitt\_21,

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

- Araceli\_35, Bogota\_35, Crosby\_35, Heather\_19, Henoccus\_35, Intolerant\_34, JackieB\_34, LazerLemon\_35, Lilbooboo\_19, Marky\_35, Microdon\_34, RunningOnE\_81, Samora\_19, Shawty\_19, Shynx\_35, Speedwell\_32, Stuff\_35, TG1\_19, UNTPL\_35, Vash\_19, phiBT1\_50,

**Summary by start number:**

Start 11:

- Found in 2 of 51 ( 3.9% ) of genes in pham
- Manual Annotations of this start: 1 of 47
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Nesbitt\_21 (BL),

Start 15:

- Found in 2 of 51 ( 3.9% ) of genes in pham
- Manual Annotations of this start: 1 of 47
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Speedwell\_32 (BD3),

Start 16:

- Found in 1 of 51 ( 2.0% ) of genes in pham
- Manual Annotations of this start: 1 of 47
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Heather\_19 (BB2),

Start 17:

- Found in 1 of 51 ( 2.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: RunningOnE\_81 (UNK),

#### Start 18:

- Found in 30 of 51 ( 58.8% ) of genes in pham
- Manual Annotations of this start: 27 of 47
- Called 96.7% of time when present
- Phage (with cluster) where this start called: AbbeyMikolon\_21 (BL), Alsaber\_28 (BD3), Alvy\_28 (BD2), BartholomewSD\_28 (BD2), Bowden\_27 (BD2), Caelum\_27 (BD2), Conan\_28 (BD3), Daudau\_26 (BD2), Dexers\_26 (BD3), ElGato\_28 (BD3), Euratis\_19 (BB1), Issmi\_27 (BD2), Jhitchelle\_26 (BD3), Kaine\_27 (BD3), Omar\_27 (BD2), Pavo\_28 (BD3), Ponzi\_60 (singleton), Provolone\_28 (BD3), RemusLoopin\_19 (BB2), Rowa\_21 (BL), Saftant\_27 (BD3), Sebastisaurus\_19 (BB2), Sudan\_27 (BD3), Thestral\_27 (BD2), TinaBelcher\_26 (BD2), TrvxScott\_25 (BD2), Vanseggelen\_32 (BD3), Verabelle\_29 (BD3), ZamZam\_27 (BD3),

#### Start 19:

- Found in 12 of 51 ( 23.5% ) of genes in pham
- Manual Annotations of this start: 11 of 47
- Called 91.7% of time when present
- Phage (with cluster) where this start called: Araceli\_35 (BH), Bogota\_35 (BH), Crosby\_35 (BH), Henoccus\_35 (BH), Intolerant\_34 (BH), JackieB\_34 (BH), LazerLemon\_35 (BH), Marky\_35 (BH), Microdon\_34 (BH), Shynx\_35 (BH), UNTPL\_35 (BH),

#### Start 20:

- Found in 6 of 51 ( 11.8% ) of genes in pham
- Manual Annotations of this start: 5 of 47
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Lilbooboo\_19 (BB1), Samora\_19 (BB1), Shawty\_19 (BB1), TG1\_19 (BB1), Vash\_19 (BB1), phiBT1\_50 (BB1),

#### Start 23:

- Found in 14 of 51 ( 27.5% ) of genes in pham
- Manual Annotations of this start: 1 of 47
- Called 7.1% of time when present
- Phage (with cluster) where this start called: Stuff\_35 (BH),

### Summary by clusters:

There are 8 clusters represented in this pham: singleton, BL, BH, BD3, BD2, UNK, BB2, BB1,

#### Info for manual annotations of cluster BB1:

- Start number 18 was manually annotated 1 time for cluster BB1.
- Start number 20 was manually annotated 5 times for cluster BB1.

#### Info for manual annotations of cluster BB2:

- Start number 16 was manually annotated 1 time for cluster BB2.
- Start number 18 was manually annotated 2 times for cluster BB2.

Info for manual annotations of cluster BD2:

- Start number 18 was manually annotated 10 times for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 15 was manually annotated 1 time for cluster BD3.
- Start number 18 was manually annotated 11 times for cluster BD3.

Info for manual annotations of cluster BH:

- Start number 19 was manually annotated 11 times for cluster BH.
- Start number 23 was manually annotated 1 time for cluster BH.

Info for manual annotations of cluster BL:

- Start number 11 was manually annotated 1 time for cluster BL.
- Start number 18 was manually annotated 2 times for cluster BL.

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

Gene: AbbeyMikolon\_21 Start: 17283, Stop: 18116, Start Num: 18

Candidate Starts for AbbeyMikolon\_21:

(9, 17250), (10, 17253), (Start: 11 @17262 has 1 MA's), (Start: 18 @17283 has 27 MA's), (37, 17463), (45, 17562), (50, 17625), (51, 17634), (56, 17679), (60, 17715), (74, 17868), (78, 17916), (82, 17946), (87, 18021), (88, 18024), (90, 18063), (94, 18105),

Gene: Alsaber\_28 Start: 22687, Stop: 23544, Start Num: 18

Candidate Starts for Alsaber\_28:

(Start: 18 @22687 has 27 MA's), (22, 22699), (37, 22882), (83, 23395),

Gene: Alvy\_28 Start: 21751, Stop: 22863, Start Num: 18

Candidate Starts for Alvy\_28:

(Start: 18 @21751 has 27 MA's), (40, 21988), (64, 22384), (76, 22630),

Gene: Araceli\_35 Start: 27602, Stop: 28348, Start Num: 19

Candidate Starts for Araceli\_35:

(Start: 19 @27602 has 11 MA's), (22, 27611), (Start: 23 @27620 has 1 MA's), (26, 27632), (28, 27650), (41, 27818), (47, 27893), (52, 27941), (55, 27959), (61, 28019), (66, 28097), (77, 28157), (78, 28166), (80, 28181),

Gene: BartholomewSD\_28 Start: 21751, Stop: 22863, Start Num: 18

Candidate Starts for BartholomewSD\_28:

(Start: 18 @21751 has 27 MA's), (40, 21988), (64, 22384), (76, 22630),

Gene: Bogota\_35 Start: 27743, Stop: 28501, Start Num: 19

Candidate Starts for Bogota\_35:

(Start: 19 @27743 has 11 MA's), (Start: 23 @27761 has 1 MA's), (24, 27764), (26, 27773), (31, 27821), (38, 27929), (41, 27959), (47, 28034), (52, 28082), (55, 28100), (66, 28250), (77, 28310), (78, 28319), (80, 28334), (85, 28388),

Gene: Bowden\_27 Start: 21679, Stop: 22788, Start Num: 18

Candidate Starts for Bowden\_27:

(3, 21613), (Start: 18 @21679 has 27 MA's), (33, 21841), (40, 21916), (76, 22555), (77, 22582),

Gene: Caelum\_27 Start: 21654, Stop: 22502, Start Num: 18

Candidate Starts for Caelum\_27:

(Start: 15 @21648 has 1 MA's), (Start: 18 @21654 has 27 MA's), (34, 21819), (35, 21828), (45, 21945), (53, 22035), (59, 22080), (60, 22098), (73, 22251), (76, 22269),

Gene: Conan\_28 Start: 22586, Stop: 23443, Start Num: 18

Candidate Starts for Conan\_28:

(13, 22580), (Start: 18 @22586 has 27 MA's), (35, 22763), (45, 22880), (76, 23213), (83, 23294),

Gene: Crosby\_35 Start: 27729, Stop: 28487, Start Num: 19

Candidate Starts for Crosby\_35:

(Start: 19 @27729 has 11 MA's), (Start: 23 @27747 has 1 MA's), (24, 27750), (26, 27759), (31, 27807), (38, 27915), (41, 27945), (47, 28020), (52, 28068), (55, 28086), (66, 28236), (77, 28296), (78, 28305), (80, 28320), (85, 28374),

Gene: Daudau\_26 Start: 21682, Stop: 22524, Start Num: 18

Candidate Starts for Daudau\_26:

(Start: 18 @21682 has 27 MA's), (34, 21838), (48, 22003), (59, 22099), (60, 22117), (71, 22258), (77, 22318), (84, 22396), (94, 22513),

Gene: Dexers\_26 Start: 22608, Stop: 23465, Start Num: 18

Candidate Starts for Dexers\_26:

(Start: 18 @22608 has 27 MA's), (22, 22620), (37, 22803), (45, 22902), (83, 23316),

Gene: ElGato\_28 Start: 22246, Stop: 23103, Start Num: 18

Candidate Starts for ElGato\_28:

(13, 22240), (Start: 18 @22246 has 27 MA's), (35, 22423), (45, 22540), (76, 22873), (83, 22954),

Gene: Euratis\_19 Start: 16260, Stop: 17087, Start Num: 18

Candidate Starts for Euratis\_19:

(4, 16197), (12, 16242), (Start: 18 @16260 has 27 MA's), (34, 16419), (37, 16446), (43, 16533), (45, 16545), (60, 16698), (62, 16737), (67, 16803), (78, 16902), (93, 17079),

Gene: Heather\_19 Start: 15807, Stop: 16646, Start Num: 16

Candidate Starts for Heather\_19:

(6, 15756), (8, 15774), (Start: 16 @15807 has 1 MA's), (36, 15978), (40, 16032), (43, 16077), (50, 16152), (60, 16242), (62, 16281), (63, 16320), (65, 16338), (78, 16464), (92, 16632),

Gene: Henoccus\_35 Start: 27612, Stop: 28364, Start Num: 19

Candidate Starts for Henoccus\_35:

(Start: 19 @27612 has 11 MA's), (22, 27621), (Start: 23 @27630 has 1 MA's), (26, 27642), (28, 27660), (41, 27828), (47, 27903), (52, 27951), (55, 27969), (61, 28029), (66, 28113), (77, 28173), (78, 28182), (92, 28350),

Gene: Intolerant\_34 Start: 27603, Stop: 28361, Start Num: 19

Candidate Starts for Intolerant\_34:

(Start: 19 @27603 has 11 MA's), (Start: 23 @27621 has 1 MA's), (24, 27624), (26, 27633), (31, 27681), (38, 27789), (41, 27819), (47, 27894), (52, 27942), (54, 27951), (55, 27960), (66, 28110), (77, 28170), (78, 28179), (80, 28194), (85, 28248),

Gene: Issmi\_27 Start: 22305, Stop: 23144, Start Num: 18

Candidate Starts for Issmi\_27:

(13, 22299), (Start: 18 @22305 has 27 MA's), (32, 22410), (34, 22458), (40, 22527), (49, 22626), (62, 22776), (77, 22938), (80, 22962),

Gene: JackieB\_34 Start: 27467, Stop: 28213, Start Num: 19

Candidate Starts for JackieB\_34:

(Start: 19 @27467 has 11 MA's), (22, 27476), (Start: 23 @27485 has 1 MA's), (26, 27497), (28, 27515), (41, 27683), (47, 27758), (52, 27806), (55, 27824), (61, 27884), (66, 27962), (77, 28022), (78, 28031), (92, 28199),

Gene: Jhitchelle\_26 Start: 22184, Stop: 23038, Start Num: 18

Candidate Starts for Jhitchelle\_26:

(Start: 18 @22184 has 27 MA's), (Start: 23 @22202 has 1 MA's), (34, 22349), (48, 22514), (77, 22835), (83, 22889),

Gene: Kaine\_27 Start: 22390, Stop: 23253, Start Num: 18

Candidate Starts for Kaine\_27:

(Start: 18 @22390 has 27 MA's), (22, 22402), (37, 22585), (83, 23104),

Gene: LazerLemon\_35 Start: 28118, Stop: 28876, Start Num: 19

Candidate Starts for LazerLemon\_35:

(2, 28043), (Start: 19 @28118 has 11 MA's), (22, 28127), (Start: 23 @28136 has 1 MA's), (34, 28253), (38, 28292), (41, 28322), (42, 28349), (47, 28397), (52, 28445), (55, 28463), (66, 28613), (75, 28637), (77, 28673), (78, 28682), (80, 28697),

Gene: Lilbooboo\_19 Start: 16465, Stop: 17286, Start Num: 20

Candidate Starts for Lilbooboo\_19:

(Start: 20 @16465 has 5 MA's), (32, 16567), (50, 16804), (56, 16858), (62, 16933), (67, 16999), (77, 17095), (78, 17104),

Gene: Marky\_35 Start: 27476, Stop: 28222, Start Num: 19

Candidate Starts for Marky\_35:

(Start: 19 @27476 has 11 MA's), (Start: 23 @27494 has 1 MA's), (24, 27497), (26, 27506), (30, 27539), (36, 27626), (41, 27680), (44, 27722), (47, 27755), (55, 27821), (57, 27845), (61, 27881), (77, 28031), (78, 28040), (80, 28055),

Gene: Microdon\_34 Start: 27426, Stop: 28184, Start Num: 19

Candidate Starts for Microdon\_34:

(Start: 19 @27426 has 11 MA's), (Start: 23 @27444 has 1 MA's), (24, 27447), (26, 27456), (31, 27504), (38, 27612), (41, 27642), (47, 27717), (52, 27765), (55, 27783), (66, 27933), (77, 27993), (78, 28002), (80, 28017), (85, 28071),

Gene: Nesbitt\_21 Start: 17334, Stop: 18188, Start Num: 11

Candidate Starts for Nesbitt\_21:

(9, 17322), (10, 17325), (Start: 11 @17334 has 1 MA's), (Start: 18 @17355 has 27 MA's), (37, 17535), (45, 17634), (50, 17697), (51, 17706), (56, 17751), (60, 17787), (74, 17940), (78, 17988), (82, 18018), (87, 18093), (88, 18096), (90, 18135), (94, 18177),

Gene: Omar\_27 Start: 21948, Stop: 22808, Start Num: 18

Candidate Starts for Omar\_27:

(1, 21825), (3, 21882), (Start: 18 @21948 has 27 MA's), (22, 21960), (Start: 23 @21969 has 1 MA's), (33, 22110), (34, 22116), (35, 22125), (40, 22185), (45, 22242), (48, 22281), (60, 22395), (72, 22545), (73, 22557), (76, 22575), (77, 22602),

Gene: Pavo\_28 Start: 22859, Stop: 23716, Start Num: 18  
Candidate Starts for Pavo\_28:  
(13, 22853), (Start: 18 @22859 has 27 MA's), (35, 23036), (45, 23153), (76, 23486), (83, 23567),

Gene: Ponzi\_60 Start: 42783, Stop: 43853, Start Num: 18  
Candidate Starts for Ponzi\_60:  
(Start: 18 @42783 has 27 MA's), (51, 43149), (68, 43389), (79, 43506), (95, 43764), (96, 43845),

Gene: Provolone\_28 Start: 22238, Stop: 23095, Start Num: 18  
Candidate Starts for Provolone\_28:  
(13, 22232), (Start: 18 @22238 has 27 MA's), (35, 22415), (45, 22532), (76, 22865), (83, 22946),

Gene: RemusLoopin\_19 Start: 16180, Stop: 16992, Start Num: 18  
Candidate Starts for RemusLoopin\_19:  
(8, 16144), (Start: 18 @16180 has 27 MA's), (34, 16336), (37, 16363), (40, 16405), (50, 16525), (56, 16579), (60, 16615), (75, 16765), (78, 16810), (80, 16825), (92, 16978),

Gene: Rowa\_21 Start: 17387, Stop: 18241, Start Num: 18  
Candidate Starts for Rowa\_21:  
(Start: 18 @17387 has 27 MA's), (25, 17417), (29, 17468), (34, 17555), (39, 17618), (40, 17624), (60, 17834), (77, 18035), (88, 18149),

Gene: RunningOnE\_81 Start: 47226, Stop: 48080, Start Num: 17  
Candidate Starts for RunningOnE\_81:  
(17, 47226), (40, 47463), (62, 47712), (91, 48069),

Gene: Saftant\_27 Start: 22851, Stop: 23717, Start Num: 18  
Candidate Starts for Saftant\_27:  
(Start: 18 @22851 has 27 MA's), (34, 23016), (53, 23232), (70, 23451), (76, 23487), (83, 23568),

Gene: Samora\_19 Start: 16585, Stop: 17418, Start Num: 20  
Candidate Starts for Samora\_19:  
(7, 16537), (14, 16573), (Start: 20 @16585 has 5 MA's), (27, 16624), (32, 16687), (34, 16735), (40, 16804), (56, 16978), (78, 17233),

Gene: Sebastisaurus\_19 Start: 16196, Stop: 17023, Start Num: 18  
Candidate Starts for Sebastisaurus\_19:  
(8, 16160), (Start: 18 @16196 has 27 MA's), (34, 16346), (37, 16373), (40, 16415), (50, 16535), (51, 16544), (67, 16730), (77, 16832), (78, 16841), (80, 16856), (81, 16862),

Gene: Shawty\_19 Start: 16138, Stop: 16980, Start Num: 20  
Candidate Starts for Shawty\_19:  
(Start: 20 @16138 has 5 MA's), (24, 16156), (45, 16426), (48, 16465), (56, 16543), (60, 16579), (62, 16618), (77, 16789), (78, 16798),

Gene: Shynx\_35 Start: 27882, Stop: 28640, Start Num: 19  
Candidate Starts for Shynx\_35:  
(Start: 19 @27882 has 11 MA's), (Start: 23 @27900 has 1 MA's), (24, 27903), (26, 27912), (31, 27960), (38, 28068), (41, 28098), (47, 28173), (52, 28221), (54, 28230), (55, 28239), (66, 28389), (77, 28449), (78, 28458), (80, 28473), (85, 28527),

Gene: Speedwell\_32 Start: 24115, Stop: 24984, Start Num: 15  
Candidate Starts for Speedwell\_32:

(Start: 15 @24115 has 1 MA's), (34, 24283), (35, 24292), (49, 24451), (83, 24835), (86, 24871),

Gene: Stuff\_35 Start: 27922, Stop: 28662, Start Num: 23

Candidate Starts for Stuff\_35:

(Start: 19 @27904 has 11 MA's), (Start: 23 @27922 has 1 MA's), (24, 27925), (26, 27934), (31, 27982), (38, 28090), (41, 28120), (47, 28195), (52, 28243), (55, 28261), (66, 28411), (77, 28471), (78, 28480), (80, 28495), (85, 28549),

Gene: Sudan\_27 Start: 22677, Stop: 23540, Start Num: 18

Candidate Starts for Sudan\_27:

(Start: 18 @22677 has 27 MA's), (22, 22689), (37, 22872), (83, 23391),

Gene: TG1\_19 Start: 15771, Stop: 16601, Start Num: 20

Candidate Starts for TG1\_19:

(5, 15711), (Start: 20 @15771 has 5 MA's), (34, 15933), (40, 16002), (45, 16059), (48, 16098), (78, 16419),

Gene: Thestral\_27 Start: 21686, Stop: 22777, Start Num: 18

Candidate Starts for Thestral\_27:

(Start: 18 @21686 has 27 MA's), (33, 21848), (64, 22301), (69, 22478), (76, 22544),

Gene: TinaBelcher\_26 Start: 21633, Stop: 22724, Start Num: 18

Candidate Starts for TinaBelcher\_26:

(3, 21564), (Start: 18 @21633 has 27 MA's), (33, 21795), (56, 22044), (64, 22248), (69, 22425), (76, 22491),

Gene: TrvxScott\_25 Start: 21664, Stop: 22770, Start Num: 18

Candidate Starts for TrvxScott\_25:

(Start: 18 @21664 has 27 MA's), (34, 21832), (35, 21841), (40, 21901), (64, 22294), (69, 22471), (76, 22537),

Gene: UNTPL\_35 Start: 27724, Stop: 28482, Start Num: 19

Candidate Starts for UNTPL\_35:

(Start: 19 @27724 has 11 MA's), (Start: 23 @27742 has 1 MA's), (24, 27745), (26, 27754), (31, 27802), (38, 27910), (41, 27940), (47, 28015), (52, 28063), (55, 28081), (66, 28231), (77, 28291), (78, 28300), (80, 28315), (85, 28369),

Gene: Vanseggelen\_32 Start: 22425, Stop: 23285, Start Num: 18

Candidate Starts for Vanseggelen\_32:

(Start: 18 @22425 has 27 MA's), (21, 22434), (34, 22590), (77, 23082), (83, 23136),

Gene: Vash\_19 Start: 16260, Stop: 17087, Start Num: 20

Candidate Starts for Vash\_19:

(Start: 20 @16260 has 5 MA's), (32, 16362), (34, 16410), (35, 16419), (50, 16599), (56, 16653), (67, 16794), (78, 16905),

Gene: Verabelle\_29 Start: 22872, Stop: 23702, Start Num: 18

Candidate Starts for Verabelle\_29:

(Start: 18 @22872 has 27 MA's), (34, 23028), (58, 23283), (77, 23499), (83, 23553),

Gene: ZamZam\_27 Start: 22786, Stop: 23637, Start Num: 18

Candidate Starts for ZamZam\_27:

(13, 22780), (Start: 18 @22786 has 27 MA's), (29, 22867), (46, 23104), (70, 23371), (76, 23407), (83, 23488), (86, 23524), (89, 23569),

Gene: phiBT1\_50 Start: 16671, Stop: 17507, Start Num: 20

Candidate Starts for phiBT1\_50:

(Start: 20 @16671 has 5 MA's), (32, 16773), (34, 16821), (45, 16947), (56, 17064), (62, 17139), (65, 17196), (78, 17310),