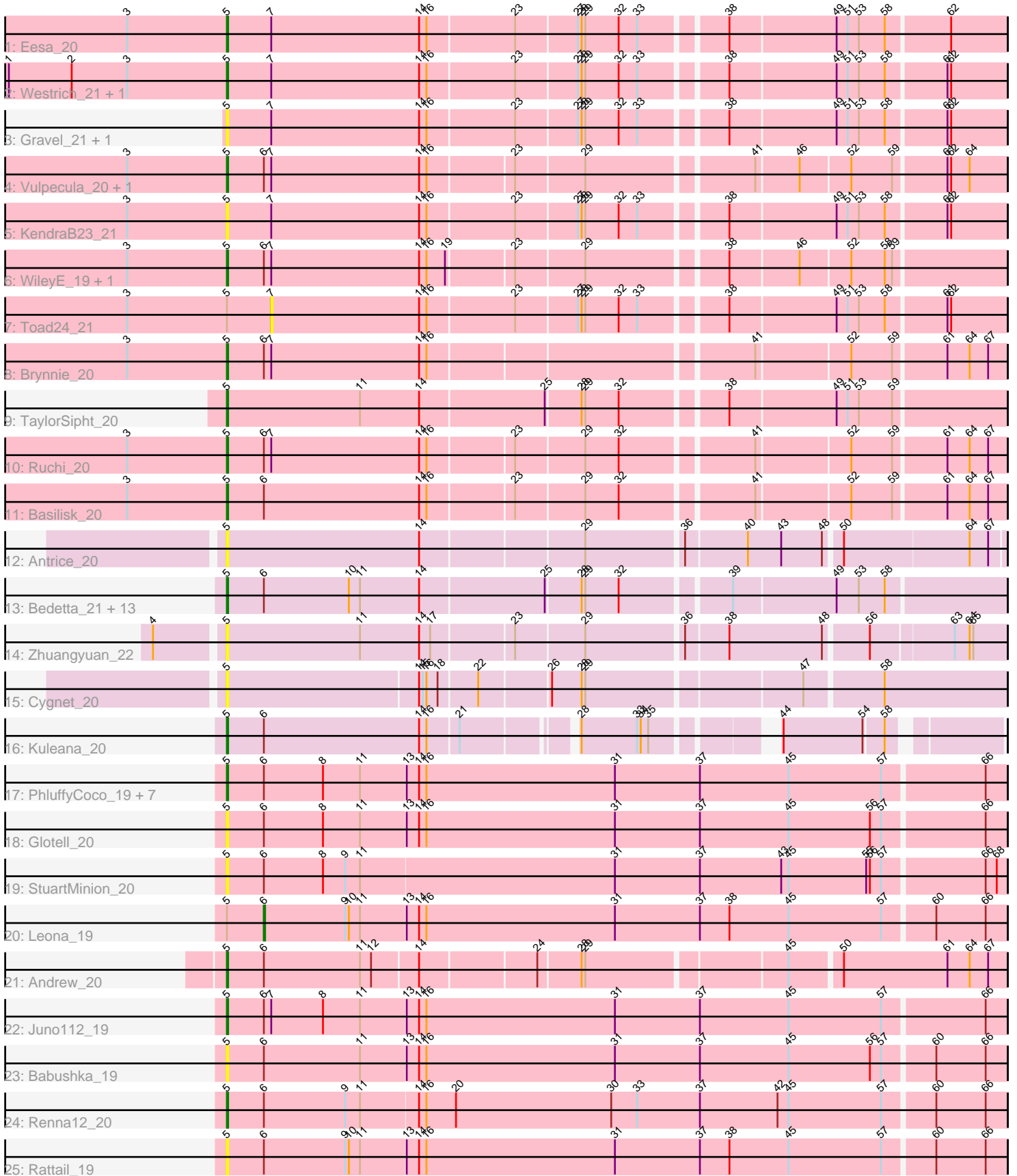


Pham 223206



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 223206 Report

This analysis was run 03/28/25 on database version 593.

Pham number 223206 has 49 members, 23 are drafts.

Phages represented in each track:

- Track 1 : Eesa\_20
- Track 2 : Westrich\_21, Orcanus\_20
- Track 3 : Gravel\_21, Pelletreau\_21
- Track 4 : Vulpecula\_20, Jamun\_20
- Track 5 : KendraB23\_21
- Track 6 : WileyE\_19, Chickaboom\_19
- Track 7 : Toad24\_21
- Track 8 : Brynnie\_20
- Track 9 : TaylorSipht\_20
- Track 10 : Ruchi\_20
- Track 11 : Basilisk\_20
- Track 12 : Antrice\_20
- Track 13 : Bedetta\_21, Lunar\_21, Colusalem\_20, Daob\_21, Kepler\_20, OtsoOtso\_20, Bibble12\_21, Amelia\_21, Polka\_20, Jerole\_21, HannahPhantana\_21, Melons\_21, Cote\_21, Coral\_20
- Track 14 : Zhuangyuan\_22
- Track 15 : Cygnet\_20
- Track 16 : Kuleana\_20
- Track 17 : PhluffyCoco\_19, DanHam62\_19, AmiCi24\_19, Atlantica\_19, KHumphrey\_19, RedFox\_19, HamCheese\_19, Camara\_19
- Track 18 : Glotell\_20
- Track 19 : StuartMinion\_20
- Track 20 : Leona\_19
- Track 21 : Andrew\_20
- Track 22 : Juno112\_19
- Track 23 : Babushka\_19
- Track 24 : Renna12\_20
- Track 25 : Rattail\_19

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

The start number called the most often in the published annotations is 5, it was called in 25 of the 26 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Amelia\_21, AmiCi24\_19, Andrew\_20, Antrice\_20, Atlantica\_19, Babushka\_19, Basilisk\_20, Bedetta\_21, Bibble12\_21, Brynnie\_20, Camara\_19, Chickaboom\_19, Colusalem\_20, Coral\_20, Cote\_21, Cygnet\_20, DanHam62\_19, Daob\_21, Eesa\_20, Glotell\_20, Gravel\_21, HamCheese\_19, HannahPhantana\_21, Jamun\_20, Jerole\_21, Juno112\_19, KHumphrey\_19, KendraB23\_21, Kepler\_20, Kuleana\_20, Lunar\_21, Melons\_21, Orcanus\_20, OtsoOtso\_20, Pelletreau\_21, PhluffyCoco\_19, Polka\_20, Rattail\_19, RedFox\_19, Renna12\_20, Ruchi\_20, StuartMinion\_20, TaylorSipt\_20, Vulpecula\_20, Westrich\_21, WileyE\_19, Zhuangyuan\_22,

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

- Leona\_19, Toad24\_21,

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

- 

### Summary by start number:

Start 5:

- Found in 49 of 49 ( 100.0% ) of genes in pham
- Manual Annotations of this start: 25 of 26
- Called 95.9% of time when present
- Phage (with cluster) where this start called: Amelia\_21 (AS2), AmiCi24\_19 (AS3), Andrew\_20 (AS3), Antrice\_20 (AS2), Atlantica\_19 (AS3), Babushka\_19 (AS3), Basilisk\_20 (AS1), Bedetta\_21 (AS2), Bibble12\_21 (AS2), Brynnie\_20 (AS1), Camara\_19 (AS3), Chickaboom\_19 (AS1), Colusalem\_20 (AS2), Coral\_20 (AS2), Cote\_21 (AS2), Cygnet\_20 (AS2), DanHam62\_19 (AS3), Daob\_21 (AS2), Eesa\_20 (AS1), Glotell\_20 (AS3), Gravel\_21 (AS1), HamCheese\_19 (AS3), HannahPhantana\_21 (AS2), Jamun\_20 (AS1), Jerole\_21 (AS2), Juno112\_19 (AS3), KHumphrey\_19 (AS3), KendraB23\_21 (AS1), Kepler\_20 (AS2), Kuleana\_20 (AS2), Lunar\_21 (AS2), Melons\_21 (AS2), Orcanus\_20 (AS1), OtsoOtso\_20 (AS2), Pelletreau\_21 (AS1), PhluffyCoco\_19 (AS3), Polka\_20 (AS2), Rattail\_19 (AS3), RedFox\_19 (AS3), Renna12\_20 (AS3), Ruchi\_20 (AS1), StuartMinion\_20 (AS3), TaylorSipt\_20 (AS1), Vulpecula\_20 (AS1), Westrich\_21 (AS1), WileyE\_19 (AS1), Zhuangyuan\_22 (AS2),

Start 6:

- Found in 38 of 49 ( 77.6% ) of genes in pham
- Manual Annotations of this start: 1 of 26
- Called 2.6% of time when present
- Phage (with cluster) where this start called: Leona\_19 (AS3),

Start 7:

- Found in 14 of 49 ( 28.6% ) of genes in pham
- No Manual Annotations of this start.
- Called 7.1% of time when present
- Phage (with cluster) where this start called: Toad24\_21 (AS1),

### Summary by clusters:

There are 3 clusters represented in this pham: AS3, AS2, AS1,

Info for manual annotations of cluster AS1:

- Start number 5 was manually annotated 9 times for cluster AS1.

Info for manual annotations of cluster AS2:

- Start number 5 was manually annotated 10 times for cluster AS2.

Info for manual annotations of cluster AS3:

- Start number 5 was manually annotated 6 times for cluster AS3.
- Start number 6 was manually annotated 1 time for cluster AS3.

### **Gene Information:**

Gene: Amelia\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Amelia\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: AmiCi24\_19 Start: 15147, Stop: 15770, Start Num: 5

Candidate Starts for AmiCi24\_19:

(Start: 5 @15147 has 25 MA's), (Start: 6 @15177 has 1 MA's), (8, 15225), (11, 15255), (13, 15291), (14, 15300), (16, 15306), (31, 15459), (37, 15528), (45, 15600), (57, 15675), (66, 15753),

Gene: Andrew\_20 Start: 15608, Stop: 16210, Start Num: 5

Candidate Starts for Andrew\_20:

(Start: 5 @15608 has 25 MA's), (Start: 6 @15638 has 1 MA's), (11, 15716), (12, 15725), (14, 15761), (24, 15851), (28, 15884), (29, 15887), (45, 16040), (50, 16079), (61, 16163), (64, 16181), (67, 16196),

Gene: Antrice\_20 Start: 16134, Stop: 16736, Start Num: 5

Candidate Starts for Antrice\_20:

(Start: 5 @16134 has 25 MA's), (14, 16290), (29, 16416), (36, 16491), (40, 16539), (43, 16566), (48, 16599), (50, 16611), (64, 16710), (67, 16725),

Gene: Atlantica\_19 Start: 15149, Stop: 15772, Start Num: 5

Candidate Starts for Atlantica\_19:

(Start: 5 @15149 has 25 MA's), (Start: 6 @15179 has 1 MA's), (8, 15227), (11, 15257), (13, 15293), (14, 15302), (16, 15308), (31, 15461), (37, 15530), (45, 15602), (57, 15677), (66, 15755),

Gene: Babushka\_19 Start: 15208, Stop: 15831, Start Num: 5

Candidate Starts for Babushka\_19:

(Start: 5 @15208 has 25 MA's), (Start: 6 @15238 has 1 MA's), (11, 15316), (13, 15352), (14, 15361), (16, 15367), (31, 15520), (37, 15589), (45, 15661), (56, 15727), (57, 15736), (60, 15775), (66, 15814),

Gene: Basilisk\_20 Start: 16877, Stop: 17476, Start Num: 5

Candidate Starts for Basilisk\_20:

(3, 16796), (Start: 5 @16877 has 25 MA's), (Start: 6 @16907 has 1 MA's), (14, 17033), (16, 17039), (23, 17105), (29, 17159), (32, 17186), (41, 17285), (52, 17357), (59, 17390), (61, 17429), (64, 17447), (67, 17462),

Gene: Bedetta\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Bedetta\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: Bible12\_21 Start: 15599, Stop: 16204, Start Num: 5

Candidate Starts for Bible12\_21:

(Start: 5 @15599 has 25 MA's), (Start: 6 @15629 has 1 MA's), (10, 15698), (11, 15707), (14, 15755), (25, 15854), (28, 15881), (29, 15884), (32, 15911), (39, 15992), (49, 16073), (53, 16091), (58, 16112),

Gene: Brynnie\_20 Start: 16689, Stop: 17288, Start Num: 5

Candidate Starts for Brynnie\_20:

(3, 16608), (Start: 5 @16689 has 25 MA's), (Start: 6 @16719 has 1 MA's), (7, 16725), (14, 16845), (16, 16851), (41, 17097), (52, 17169), (59, 17202), (61, 17241), (64, 17259), (67, 17274),

Gene: Camara\_19 Start: 15150, Stop: 15773, Start Num: 5

Candidate Starts for Camara\_19:

(Start: 5 @15150 has 25 MA's), (Start: 6 @15180 has 1 MA's), (8, 15228), (11, 15258), (13, 15294), (14, 15303), (16, 15309), (31, 15462), (37, 15531), (45, 15603), (57, 15678), (66, 15756),

Gene: Chickaboom\_19 Start: 15615, Stop: 16214, Start Num: 5

Candidate Starts for Chickaboom\_19:

(3, 15534), (Start: 5 @15615 has 25 MA's), (Start: 6 @15645 has 1 MA's), (7, 15651), (14, 15771), (16, 15777), (19, 15792), (23, 15843), (29, 15897), (38, 16002), (46, 16056), (52, 16095), (58, 16122), (59, 16128),

Gene: Colusalem\_20 Start: 15435, Stop: 16040, Start Num: 5

Candidate Starts for Colusalem\_20:

(Start: 5 @15435 has 25 MA's), (Start: 6 @15465 has 1 MA's), (10, 15534), (11, 15543), (14, 15591), (25, 15690), (28, 15717), (29, 15720), (32, 15747), (39, 15828), (49, 15909), (53, 15927), (58, 15948),

Gene: Coral\_20 Start: 15435, Stop: 16040, Start Num: 5

Candidate Starts for Coral\_20:

(Start: 5 @15435 has 25 MA's), (Start: 6 @15465 has 1 MA's), (10, 15534), (11, 15543), (14, 15591), (25, 15690), (28, 15717), (29, 15720), (32, 15747), (39, 15828), (49, 15909), (53, 15927), (58, 15948),

Gene: Cote\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Cote\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: Cygnet\_20 Start: 16244, Stop: 16846, Start Num: 5

Candidate Starts for Cygnet\_20:

(Start: 5 @16244 has 25 MA's), (14, 16397), (15, 16400), (16, 16403), (18, 16412), (22, 16442), (26, 16496), (28, 16520), (29, 16523), (47, 16688), (58, 16748),

Gene: DanHam62\_19 Start: 15149, Stop: 15772, Start Num: 5

Candidate Starts for DanHam62\_19:

(Start: 5 @15149 has 25 MA's), (Start: 6 @15179 has 1 MA's), (8, 15227), (11, 15257), (13, 15293), (14, 15302), (16, 15308), (31, 15461), (37, 15530), (45, 15602), (57, 15677), (66, 15755),

Gene: Daob\_21 Start: 15599, Stop: 16204, Start Num: 5

Candidate Starts for Daob\_21:

(Start: 5 @15599 has 25 MA's), (Start: 6 @15629 has 1 MA's), (10, 15698), (11, 15707), (14, 15755), (25, 15854), (28, 15881), (29, 15884), (32, 15911), (39, 15992), (49, 16073), (53, 16091), (58, 16112),

Gene: Eesa\_20 Start: 16837, Stop: 17442, Start Num: 5

Candidate Starts for Eesa\_20:

(3, 16756), (Start: 5 @16837 has 25 MA's), (7, 16873), (14, 16993), (16, 16999), (23, 17068), (27, 17116), (28, 17119), (29, 17122), (32, 17149), (33, 17164), (38, 17227), (49, 17311), (51, 17320), (53, 17329), (58, 17350), (62, 17398),

Gene: Glotell\_20 Start: 15147, Stop: 15770, Start Num: 5

Candidate Starts for Glotell\_20:

(Start: 5 @15147 has 25 MA's), (Start: 6 @15177 has 1 MA's), (8, 15225), (11, 15255), (13, 15291), (14, 15300), (16, 15306), (31, 15459), (37, 15528), (45, 15600), (56, 15666), (57, 15675), (66, 15753),

Gene: Gravel\_21 Start: 16743, Stop: 17348, Start Num: 5

Candidate Starts for Gravel\_21:

(Start: 5 @16743 has 25 MA's), (7, 16779), (14, 16899), (16, 16905), (23, 16974), (27, 17022), (28, 17025), (29, 17028), (32, 17055), (33, 17070), (38, 17133), (49, 17217), (51, 17226), (53, 17235), (58, 17256), (61, 17301), (62, 17304),

Gene: HamCheese\_19 Start: 15149, Stop: 15772, Start Num: 5

Candidate Starts for HamCheese\_19:

(Start: 5 @15149 has 25 MA's), (Start: 6 @15179 has 1 MA's), (8, 15227), (11, 15257), (13, 15293), (14, 15302), (16, 15308), (31, 15461), (37, 15530), (45, 15602), (57, 15677), (66, 15755),

Gene: HannahPhantana\_21 Start: 15599, Stop: 16204, Start Num: 5

Candidate Starts for HannahPhantana\_21:

(Start: 5 @15599 has 25 MA's), (Start: 6 @15629 has 1 MA's), (10, 15698), (11, 15707), (14, 15755), (25, 15854), (28, 15881), (29, 15884), (32, 15911), (39, 15992), (49, 16073), (53, 16091), (58, 16112),

Gene: Jamun\_20 Start: 16283, Stop: 16882, Start Num: 5

Candidate Starts for Jamun\_20:

(3, 16202), (Start: 5 @16283 has 25 MA's), (Start: 6 @16313 has 1 MA's), (7, 16319), (14, 16439), (16, 16445), (23, 16511), (29, 16565), (41, 16691), (46, 16724), (52, 16763), (59, 16796), (61, 16835), (62, 16838), (64, 16853),

Gene: Jerole\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Jerole\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: Juno112\_19 Start: 15150, Stop: 15773, Start Num: 5

Candidate Starts for Juno112\_19:

(Start: 5 @15150 has 25 MA's), (Start: 6 @15180 has 1 MA's), (7, 15186), (8, 15228), (11, 15258), (13, 15294), (14, 15303), (16, 15309), (31, 15462), (37, 15531), (45, 15603), (57, 15678), (66, 15756),

Gene: KHumphrey\_19 Start: 15147, Stop: 15770, Start Num: 5

Candidate Starts for KHumphrey\_19:

(Start: 5 @15147 has 25 MA's), (Start: 6 @15177 has 1 MA's), (8, 15225), (11, 15255), (13, 15291), (14, 15300), (16, 15306), (31, 15459), (37, 15528), (45, 15600), (57, 15675), (66, 15753),

Gene: KendraB23\_21 Start: 16744, Stop: 17349, Start Num: 5

Candidate Starts for KendraB23\_21:

(3, 16663), (Start: 5 @16744 has 25 MA's), (7, 16780), (14, 16900), (16, 16906), (23, 16975), (27, 17023), (28, 17026), (29, 17029), (32, 17056), (33, 17071), (38, 17134), (49, 17218), (51, 17227), (53, 17236), (58, 17257), (61, 17302), (62, 17305),

Gene: Kepler\_20 Start: 15434, Stop: 16039, Start Num: 5

Candidate Starts for Kepler\_20:

(Start: 5 @15434 has 25 MA's), (Start: 6 @15464 has 1 MA's), (10, 15533), (11, 15542), (14, 15590), (25, 15689), (28, 15716), (29, 15719), (32, 15746), (39, 15827), (49, 15908), (53, 15926), (58, 15947),

Gene: Kuleana\_20 Start: 15599, Stop: 16150, Start Num: 5

Candidate Starts for Kuleana\_20:

(Start: 5 @15599 has 25 MA's), (Start: 6 @15629 has 1 MA's), (14, 15755), (16, 15761), (21, 15785), (28, 15863), (33, 15908), (34, 15911), (35, 15917), (44, 15995), (54, 16058), (58, 16073),

Gene: Leona\_19 Start: 15239, Stop: 15832, Start Num: 6

Candidate Starts for Leona\_19:

(Start: 5 @15209 has 25 MA's), (Start: 6 @15239 has 1 MA's), (9, 15305), (10, 15308), (11, 15317), (13, 15353), (14, 15362), (16, 15368), (31, 15521), (37, 15590), (38, 15614), (45, 15662), (57, 15737), (60, 15776), (66, 15815),

Gene: Lunar\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Lunar\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: Melons\_21 Start: 15596, Stop: 16201, Start Num: 5

Candidate Starts for Melons\_21:

(Start: 5 @15596 has 25 MA's), (Start: 6 @15626 has 1 MA's), (10, 15695), (11, 15704), (14, 15752), (25, 15851), (28, 15878), (29, 15881), (32, 15908), (39, 15989), (49, 16070), (53, 16088), (58, 16109),

Gene: Orcanus\_20 Start: 16537, Stop: 17142, Start Num: 5

Candidate Starts for Orcanus\_20:

(1, 16360), (2, 16411), (3, 16456), (Start: 5 @16537 has 25 MA's), (7, 16573), (14, 16693), (16, 16699), (23, 16768), (27, 16816), (28, 16819), (29, 16822), (32, 16849), (33, 16864), (38, 16927), (49, 17011), (51, 17020), (53, 17029), (58, 17050), (61, 17095), (62, 17098),

Gene: OtsoOtso\_20 Start: 15438, Stop: 16043, Start Num: 5

Candidate Starts for OtsoOtso\_20:

(Start: 5 @15438 has 25 MA's), (Start: 6 @15468 has 1 MA's), (10, 15537), (11, 15546), (14, 15594), (25, 15693), (28, 15720), (29, 15723), (32, 15750), (39, 15831), (49, 15912), (53, 15930), (58, 15951),

Gene: Pelletreau\_21 Start: 16743, Stop: 17348, Start Num: 5

Candidate Starts for Pelletreau\_21:

(Start: 5 @16743 has 25 MA's), (7, 16779), (14, 16899), (16, 16905), (23, 16974), (27, 17022), (28, 17025), (29, 17028), (32, 17055), (33, 17070), (38, 17133), (49, 17217), (51, 17226), (53, 17235), (58, 17256), (61, 17301), (62, 17304),

Gene: PhluffyCoco\_19 Start: 15149, Stop: 15772, Start Num: 5

Candidate Starts for PhluffyCoco\_19:

(Start: 5 @15149 has 25 MA's), (Start: 6 @15179 has 1 MA's), (8, 15227), (11, 15257), (13, 15293), (14, 15302), (16, 15308), (31, 15461), (37, 15530), (45, 15602), (57, 15677), (66, 15755),

Gene: Polka\_20 Start: 15438, Stop: 16043, Start Num: 5

Candidate Starts for Polka\_20:

(Start: 5 @15438 has 25 MA's), (Start: 6 @15468 has 1 MA's), (10, 15537), (11, 15546), (14, 15594), (25, 15693), (28, 15720), (29, 15723), (32, 15750), (39, 15831), (49, 15912), (53, 15930), (58, 15951),

Gene: Rattail\_19 Start: 15209, Stop: 15832, Start Num: 5

Candidate Starts for Rattail\_19:

(Start: 5 @15209 has 25 MA's), (Start: 6 @15239 has 1 MA's), (9, 15305), (10, 15308), (11, 15317), (13, 15353), (14, 15362), (16, 15368), (31, 15521), (37, 15590), (38, 15614), (45, 15662), (57, 15737), (60, 15776), (66, 15815),

Gene: RedFox\_19 Start: 15149, Stop: 15772, Start Num: 5

Candidate Starts for RedFox\_19:

(Start: 5 @15149 has 25 MA's), (Start: 6 @15179 has 1 MA's), (8, 15227), (11, 15257), (13, 15293), (14, 15302), (16, 15308), (31, 15461), (37, 15530), (45, 15602), (57, 15677), (66, 15755),

Gene: Renna12\_20 Start: 15499, Stop: 16122, Start Num: 5

Candidate Starts for Renna12\_20:

(Start: 5 @15499 has 25 MA's), (Start: 6 @15529 has 1 MA's), (9, 15595), (11, 15607), (14, 15652), (16, 15658), (20, 15682), (30, 15808), (33, 15829), (37, 15880), (42, 15943), (45, 15952), (57, 16027), (60, 16066), (66, 16105),

Gene: Ruchi\_20 Start: 16823, Stop: 17422, Start Num: 5

Candidate Starts for Ruchi\_20:

(3, 16742), (Start: 5 @16823 has 25 MA's), (Start: 6 @16853 has 1 MA's), (7, 16859), (14, 16979), (16, 16985), (23, 17051), (29, 17105), (32, 17132), (41, 17231), (52, 17303), (59, 17336), (61, 17375), (64, 17393), (67, 17408),

Gene: StuartMinion\_20 Start: 15193, Stop: 15816, Start Num: 5

Candidate Starts for StuartMinion\_20:

(Start: 5 @15193 has 25 MA's), (Start: 6 @15223 has 1 MA's), (8, 15271), (9, 15289), (11, 15301), (31, 15505), (37, 15574), (43, 15640), (45, 15646), (55, 15709), (56, 15712), (57, 15721), (66, 15799), (68, 15808),

Gene: TaylorSipht\_20 Start: 15556, Stop: 16161, Start Num: 5

Candidate Starts for TaylorSipht\_20:

(Start: 5 @15556 has 25 MA's), (11, 15664), (14, 15712), (25, 15811), (28, 15838), (29, 15841), (32, 15868), (38, 15946), (49, 16030), (51, 16039), (53, 16048), (59, 16075),

Gene: Toad24\_21 Start: 16780, Stop: 17349, Start Num: 7

Candidate Starts for Toad24\_21:

(3, 16663), (Start: 5 @16744 has 25 MA's), (7, 16780), (14, 16900), (16, 16906), (23, 16975), (27, 17023), (28, 17026), (29, 17029), (32, 17056), (33, 17071), (38, 17134), (49, 17218), (51, 17227), (53, 17236), (58, 17257), (61, 17302), (62, 17305),

Gene: Vulpecula\_20 Start: 16281, Stop: 16880, Start Num: 5

Candidate Starts for Vulpecula\_20:

(3, 16200), (Start: 5 @16281 has 25 MA's), (Start: 6 @16311 has 1 MA's), (7, 16317), (14, 16437), (16, 16443), (23, 16509), (29, 16563), (41, 16689), (46, 16722), (52, 16761), (59, 16794), (61, 16833), (62, 16836), (64, 16851),

Gene: Westrich\_21 Start: 16733, Stop: 17338, Start Num: 5

Candidate Starts for Westrich\_21:

(1, 16556), (2, 16607), (3, 16652), (Start: 5 @16733 has 25 MA's), (7, 16769), (14, 16889), (16, 16895), (23, 16964), (27, 17012), (28, 17015), (29, 17018), (32, 17045), (33, 17060), (38, 17123), (49, 17207), (51, 17216), (53, 17225), (58, 17246), (61, 17291), (62, 17294),

Gene: WileyE\_19 Start: 15615, Stop: 16214, Start Num: 5



Candidate Starts for WileyE\_19:

(3, 15534), (Start: 5 @15615 has 25 MA's), (Start: 6 @15645 has 1 MA's), (7, 15651), (14, 15771), (16, 15777), (19, 15792), (23, 15843), (29, 15897), (38, 16002), (46, 16056), (52, 16095), (58, 16122), (59, 16128),

Gene: Zhuangyuan\_22 Start: 15984, Stop: 16586, Start Num: 5

Candidate Starts for Zhuangyuan\_22:

(4, 15933), (Start: 5 @15984 has 25 MA's), (11, 16092), (14, 16140), (17, 16149), (23, 16212), (29, 16266), (36, 16341), (38, 16374), (48, 16449), (56, 16482), (63, 16545), (64, 16557), (65, 16560),