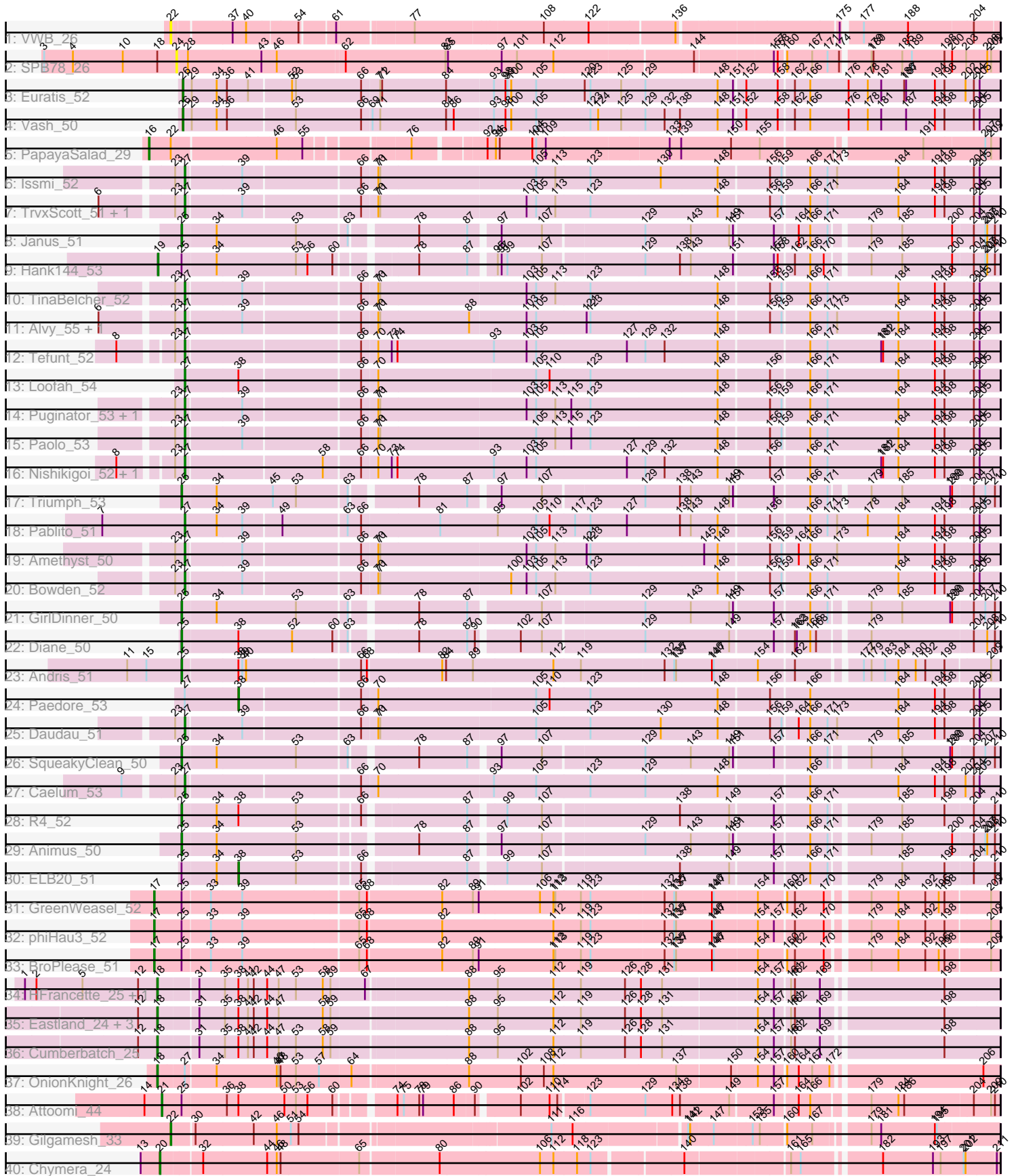


Pham 194087



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 194087 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 194087 has 48 members, 2 are drafts.

Phages represented in each track:

- Track 1 : VWB\_26
- Track 2 : SPB78\_26
- Track 3 : Euratis\_52
- Track 4 : Vash\_50
- Track 5 : PapayaSalad\_29
- Track 6 : Issmi\_52
- Track 7 : TrvxScott\_51, Thestral\_54
- Track 8 : Janus\_51
- Track 9 : Hank144\_53
- Track 10 : TinaBelcher\_52
- Track 11 : Alvy\_55, BartholomewSD\_55
- Track 12 : Tefunt\_52
- Track 13 : Loofah\_54
- Track 14 : Puginator\_53, Zainub\_53
- Track 15 : Paolo\_53
- Track 16 : Nishikigoi\_52, Haizum\_52
- Track 17 : Triumph\_53
- Track 18 : Pablito\_51
- Track 19 : Amethyst\_50
- Track 20 : Bowden\_52
- Track 21 : GirlDinner\_50
- Track 22 : Diane\_50
- Track 23 : Andris\_51
- Track 24 : Paedore\_53
- Track 25 : Daudau\_51
- Track 26 : SqueakyClean\_50
- Track 27 : Caelum\_53
- Track 28 : R4\_52
- Track 29 : Animus\_50
- Track 30 : ELB20\_51
- Track 31 : GreenWeasel\_52
- Track 32 : phiHau3\_52
- Track 33 : BroPlease\_51

- Track 34 : HFrancette\_25, Ignacio\_25
- Track 35 : Eastland\_24, Eklok\_25, AxeJC\_24, Piccadilly\_24
- Track 36 : Cumberbatch\_25
- Track 37 : OnionKnight\_26
- Track 38 : Attoomi\_44
- Track 39 : Gilgamesh\_33
- Track 40 : Chymera\_24

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

The start number called the most often in the published annotations is 27, it was called in 18 of the 46 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Alvy\_55, Amethyst\_50, BartholomewSD\_55, Bowden\_52, Caelum\_53, Daudau\_51, Haizum\_52, Issmi\_52, Loofah\_54, Nishikigoi\_52, Pablito\_51, Paolo\_53, Puginator\_53, Tefunt\_52, Thestral\_54, TinaBelcher\_52, TrvxScott\_51, Zainub\_53,

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

- OnionKnight\_26, Paedore\_53,

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

- Andris\_51, Animus\_50, Attoomi\_44, AxeJC\_24, BroPlease\_51, Chymera\_24, Cumberbatch\_25, Diane\_50, ELB20\_51, Eastland\_24, Eklok\_25, Euratis\_52, Gilgamesh\_33, GirlDinner\_50, GreenWeasel\_52, HFrancette\_25, Hank144\_53, Ignacio\_25, Janus\_51, PapayaSalad\_29, Piccadilly\_24, R4\_52, SPB78\_26, SqueakyClean\_50, Triumph\_53, VWB\_26, Vash\_50, phiHau3\_52,

### **Summary by start number:**

Start 16:

- Found in 1 of 48 ( 2.1% ) of genes in pham
- Manual Annotations of this start: 1 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: PapayaSalad\_29 (BC3),

Start 17:

- Found in 3 of 48 ( 6.2% ) of genes in pham
- Manual Annotations of this start: 3 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BroPlease\_51 (BD4), GreenWeasel\_52 (BD4), phiHau3\_52 (BD4),

Start 18:

- Found in 9 of 48 ( 18.8% ) of genes in pham
- Manual Annotations of this start: 8 of 46
- Called 88.9% of time when present
- Phage (with cluster) where this start called: AxeJC\_24 (BP), Cumberbatch\_25 (BP), Eastland\_24 (BP), Eklok\_25 (BP), HFrancette\_25 (BP), Ignacio\_25 (BP), OnionKnight\_26 (singleton), Piccadilly\_24 (BP),

Start 19:

- Found in 1 of 48 ( 2.1% ) of genes in pham
- Manual Annotations of this start: 1 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Hank144\_53 (BD2),

Start 20:

- Found in 1 of 48 ( 2.1% ) of genes in pham
- Manual Annotations of this start: 1 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Chymera\_24 (singleton),

Start 21:

- Found in 1 of 48 ( 2.1% ) of genes in pham
- Manual Annotations of this start: 1 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Attoomi\_44 (singleton),

Start 22:

- Found in 3 of 48 ( 6.2% ) of genes in pham
- Manual Annotations of this start: 1 of 46
- Called 66.7% of time when present
- Phage (with cluster) where this start called: Gilgamesh\_33 (singleton), VWB\_26 (BA),

Start 24:

- Found in 1 of 48 ( 2.1% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: SPB78\_26 (BA),

Start 25:

- Found in 14 of 48 ( 29.2% ) of genes in pham
- Manual Annotations of this start: 8 of 46
- Called 57.1% of time when present
- Phage (with cluster) where this start called: Andris\_51 (BD2), Animus\_50 (BD2), Diane\_50 (BD2), GirlDinner\_50 (BD2), Janus\_51 (BD2), R4\_52 (BD2), SqueakyClean\_50 (BD2), Triumph\_53 (BD2),

Start 26:

- Found in 2 of 48 ( 4.2% ) of genes in pham
- Manual Annotations of this start: 2 of 46
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Euratis\_52 (BB1), Vash\_50 (BB1),

Start 27:

- Found in 20 of 48 ( 41.7% ) of genes in pham
- Manual Annotations of this start: 18 of 46
- Called 90.0% of time when present
- Phage (with cluster) where this start called: Alvy\_55 (BD2), Amethyst\_50 (BD2), BartholomewSD\_55 (BD2), Bowden\_52 (BD2), Caelum\_53 (BD2), Daudau\_51 (BD2), Haizum\_52 (BD2), Issmi\_52 (BD2), Loofah\_54 (BD2), Nishikigoi\_52 (BD2),

Pablito\_51 (BD2), Paolo\_53 (BD2), Puginator\_53 (BD2), Tefunt\_52 (BD2),  
Thestral\_54 (BD2), TinaBelcher\_52 (BD2), TrvxScott\_51 (BD2), Zainub\_53 (BD2),

Start 38:

- Found in 14 of 48 ( 29.2% ) of genes in pham
- Manual Annotations of this start: 2 of 46
- Called 14.3% of time when present
- Phage (with cluster) where this start called: ELB20\_51 (BD2), Paedore\_53 (BD2),

### **Summary by clusters:**

There are 7 clusters represented in this pham: singleton, BA, BD4, BP, BD2, BB1, BC3,

Info for manual annotations of cluster BB1:

- Start number 26 was manually annotated 2 times for cluster BB1.

Info for manual annotations of cluster BC3:

- Start number 16 was manually annotated 1 time for cluster BC3.

Info for manual annotations of cluster BD2:

- Start number 19 was manually annotated 1 time for cluster BD2.
- Start number 25 was manually annotated 8 times for cluster BD2.
- Start number 27 was manually annotated 18 times for cluster BD2.
- Start number 38 was manually annotated 2 times for cluster BD2.

Info for manual annotations of cluster BD4:

- Start number 17 was manually annotated 3 times for cluster BD4.

Info for manual annotations of cluster BP:

- Start number 18 was manually annotated 7 times for cluster BP.

### **Gene Information:**

Gene: Alvy\_55 Start: 38519, Stop: 37290, Start Num: 27

Candidate Starts for Alvy\_55:

(6, 38639), (23, 38534), (Start: 27 @38519 has 18 MA's), (39, 38435), (66, 38261), (70, 38237), (71, 38234), (88, 38096), (103, 38009), (105, 37994), (121, 37916), (123, 37910), (148, 37715), (156, 37640), (159, 37622), (166, 37583), (171, 37556), (173, 37541), (184, 37445), (194, 37388), (198, 37373), (204, 37328), (205, 37319),

Gene: Amethyst\_50 Start: 36749, Stop: 35520, Start Num: 27

Candidate Starts for Amethyst\_50:

(23, 36764), (Start: 27 @36749 has 18 MA's), (39, 36665), (66, 36491), (70, 36467), (71, 36464), (103, 36239), (105, 36224), (113, 36194), (121, 36146), (123, 36140), (145, 35966), (148, 35945), (156, 35870), (159, 35852), (164, 35831), (166, 35813), (173, 35771), (184, 35675), (194, 35618), (198, 35603), (204, 35558), (205, 35549),

Gene: Andris\_51 Start: 36706, Stop: 35495, Start Num: 25

Candidate Starts for Andris\_51:

(11, 36790), (15, 36760), (Start: 25 @36706 has 8 MA's), (Start: 38 @36622 has 2 MA's), (39, 36616), (40, 36610), (66, 36439), (68, 36430), (82, 36316), (84, 36310), (89, 36268), (112, 36145), (119, 36103), (132, 35977), (135, 35962), (137, 35959), (146, 35905), (147, 35902), (154, 35836), (162, 35785), (177, 35698), (179, 35686), (183, 35665), (184, 35644), (190, 35617), (192, 35602), (198, 35572), (209, 35506),

Gene: Animus\_50 Start: 36998, Stop: 35820, Start Num: 25

Candidate Starts for Animus\_50:

(Start: 25 @36998 has 8 MA's), (34, 36947), (53, 36824), (78, 36659), (87, 36587), (97, 36548), (107, 36485), (129, 36335), (143, 36266), (149, 36206), (151, 36200), (157, 36143), (166, 36092), (171, 36065), (179, 36014), (185, 35966), (200, 35888), (204, 35858), (207, 35840), (208, 35837), (210, 35825),

Gene: Attoomi\_44 Start: 33458, Stop: 34666, Start Num: 21

Candidate Starts for Attoomi\_44:

(14, 33431), (Start: 21 @33458 has 1 MA's), (Start: 25 @33488 has 8 MA's), (36, 33554), (Start: 38 @33572 has 2 MA's), (50, 33644), (53, 33662), (56, 33680), (60, 33719), (74, 33794), (75, 33803), (78, 33827), (79, 33833), (86, 33881), (90, 33911), (102, 33968), (110, 34013), (114, 34025), (123, 34067), (129, 34151), (134, 34193), (138, 34205), (149, 34280), (157, 34343), (164, 34376), (166, 34394), (179, 34472), (184, 34514), (186, 34523), (204, 34628), (209, 34655), (210, 34661),

Gene: AxeJC\_24 Start: 18954, Stop: 20204, Start Num: 18

Candidate Starts for AxeJC\_24:

(12, 18924), (Start: 18 @18954 has 8 MA's), (31, 19011), (35, 19050), (Start: 38 @19071 has 2 MA's), (41, 19086), (42, 19095), (44, 19116), (47, 19134), (58, 19203), (59, 19215), (88, 19416), (95, 19461), (112, 19548), (119, 19590), (126, 19659), (128, 19683), (131, 19716), (154, 19854), (157, 19878), (161, 19899), (162, 19905), (169, 19944), (198, 20118),

Gene: BartholomewSD\_55 Start: 37638, Stop: 36409, Start Num: 27

Candidate Starts for BartholomewSD\_55:

(6, 37758), (23, 37653), (Start: 27 @37638 has 18 MA's), (39, 37554), (66, 37380), (70, 37356), (71, 37353), (88, 37215), (103, 37128), (105, 37113), (121, 37035), (123, 37029), (148, 36834), (156, 36759), (159, 36741), (166, 36702), (171, 36675), (173, 36660), (184, 36564), (194, 36507), (198, 36492), (204, 36447), (205, 36438),

Gene: Bowden\_52 Start: 38433, Stop: 37204, Start Num: 27

Candidate Starts for Bowden\_52:

(23, 38448), (Start: 27 @38433 has 18 MA's), (39, 38349), (66, 38175), (70, 38151), (71, 38148), (100, 37947), (103, 37923), (105, 37908), (113, 37878), (123, 37824), (148, 37629), (156, 37554), (159, 37536), (166, 37497), (171, 37470), (184, 37359), (194, 37302), (198, 37287), (204, 37242), (205, 37233),

Gene: BroPlease\_51 Start: 35752, Stop: 34499, Start Num: 17

Candidate Starts for BroPlease\_51:

(Start: 17 @35752 has 3 MA's), (Start: 25 @35710 has 8 MA's), (33, 35668), (39, 35620), (65, 35446), (68, 35434), (82, 35320), (89, 35272), (91, 35263), (112, 35149), (113, 35146), (119, 35107), (123, 35092), (132, 34981), (135, 34966), (137, 34963), (146, 34909), (147, 34906), (154, 34840), (160, 34801), (162, 34789), (170, 34744), (179, 34690), (184, 34648), (192, 34606), (196, 34585), (198, 34576), (209, 34510),

Gene: Caelum\_53 Start: 36961, Stop: 35732, Start Num: 27

Candidate Starts for Caelum\_53:

(9, 37045), (23, 36976), (Start: 27 @36961 has 18 MA's), (66, 36703), (70, 36679), (93, 36502), (105, 36436), (123, 36352), (129, 36268), (148, 36157), (166, 36025), (184, 35887), (194, 35830), (198, 35815), (202, 35782), (204, 35770), (205, 35761),

Gene: Chymera\_24 Start: 18154, Stop: 19377, Start Num: 20

Candidate Starts for Chymera\_24:

(13, 18124), (Start: 20 @18154 has 1 MA's), (32, 18211), (44, 18310), (46, 18325), (48, 18331), (65, 18448), (80, 18565), (106, 18718), (112, 18739), (118, 18775), (123, 18796), (140, 18925), (161, 19075), (165, 19090), (182, 19198), (193, 19276), (197, 19288), (201, 19324), (202, 19327), (211, 19372),

Gene: Cumberbatch\_25 Start: 18973, Stop: 20223, Start Num: 18

Candidate Starts for Cumberbatch\_25:

(12, 18943), (Start: 18 @18973 has 8 MA's), (31, 19030), (35, 19069), (Start: 38 @19090 has 2 MA's), (41, 19105), (42, 19114), (44, 19135), (47, 19153), (53, 19180), (58, 19222), (59, 19234), (88, 19435), (95, 19480), (112, 19567), (119, 19609), (126, 19678), (128, 19702), (131, 19735), (154, 19873), (157, 19897), (161, 19918), (162, 19924), (169, 19963), (198, 20137),

Gene: Daudau\_51 Start: 36911, Stop: 35682, Start Num: 27

Candidate Starts for Daudau\_51:

(23, 36926), (Start: 27 @36911 has 18 MA's), (39, 36827), (66, 36653), (70, 36629), (71, 36626), (105, 36386), (123, 36302), (130, 36194), (148, 36107), (156, 36032), (159, 36014), (164, 35993), (166, 35975), (171, 35948), (173, 35933), (184, 35837), (194, 35780), (198, 35765), (204, 35720), (205, 35711),

Gene: Diane\_50 Start: 36947, Stop: 35769, Start Num: 25

Candidate Starts for Diane\_50:

(Start: 25 @36947 has 8 MA's), (Start: 38 @36863 has 2 MA's), (52, 36779), (60, 36716), (63, 36698), (78, 36608), (87, 36536), (90, 36524), (102, 36467), (107, 36434), (129, 36284), (149, 36155), (157, 36092), (162, 36065), (163, 36062), (166, 36041), (168, 36032), (179, 35963), (204, 35807), (208, 35786), (210, 35774),

Gene: ELB20\_51 Start: 37357, Stop: 36266, Start Num: 38

Candidate Starts for ELB20\_51:

(Start: 25 @37441 has 8 MA's), (34, 37390), (Start: 38 @37357 has 2 MA's), (53, 37267), (66, 37177), (87, 37033), (99, 36985), (107, 36931), (138, 36727), (149, 36652), (157, 36589), (166, 36538), (171, 36511), (185, 36412), (198, 36346), (204, 36304), (210, 36271),

Gene: Eastland\_24 Start: 18939, Stop: 20189, Start Num: 18

Candidate Starts for Eastland\_24:

(12, 18909), (Start: 18 @18939 has 8 MA's), (31, 18996), (35, 19035), (Start: 38 @19056 has 2 MA's), (41, 19071), (42, 19080), (44, 19101), (47, 19119), (58, 19188), (59, 19200), (88, 19401), (95, 19446), (112, 19533), (119, 19575), (126, 19644), (128, 19668), (131, 19701), (154, 19839), (157, 19863), (161, 19884), (162, 19890), (169, 19929), (198, 20103),

Gene: Eklok\_25 Start: 18954, Stop: 20204, Start Num: 18

Candidate Starts for Eklok\_25:

(12, 18924), (Start: 18 @18954 has 8 MA's), (31, 19011), (35, 19050), (Start: 38 @19071 has 2 MA's), (41, 19086), (42, 19095), (44, 19116), (47, 19134), (58, 19203), (59, 19215), (88, 19416), (95, 19461), (112, 19548), (119, 19590), (126, 19659), (128, 19683), (131, 19716), (154, 19854), (157, 19878), (161, 19899), (162, 19905), (169, 19944), (198, 20118),

Gene: Euratis\_52 Start: 35732, Stop: 36973, Start Num: 26

Candidate Starts for Euratis\_52:

(Start: 26 @35732 has 2 MA's), (29, 35744), (34, 35783), (36, 35798), (41, 35831), (52, 35894), (53, 35900), (66, 36002), (71, 36029), (72, 36032), (84, 36131), (93, 36203), (98, 36221), (99, 36224), (100, 36230), (105, 36269), (120, 36344), (123, 36353), (125, 36401), (129, 36437), (148, 36548), (151, 36572), (152, 36587), (158, 36635), (162, 36656), (166, 36680), (176, 36740), (178, 36770), (181, 36791), (186, 36827), (187, 36830), (194, 36875), (198, 36890), (202, 36923), (204, 36935), (205, 36944),

Gene: Gilgamesh\_33 Start: 19721, Stop: 20911, Start Num: 22

Candidate Starts for Gilgamesh\_33:

(Start: 22 @19721 has 1 MA's), (30, 19751), (42, 19841), (46, 19877), (51, 19898), (54, 19910), (111, 20270), (116, 20303), (141, 20468), (142, 20471), (147, 20504), (153, 20561), (155, 20570), (160, 20606), (167, 20645), (179, 20717), (181, 20732), (194, 20816), (195, 20819),

Gene: GirlDinner\_50 Start: 36499, Stop: 35321, Start Num: 25

Candidate Starts for GirlDinner\_50:

(Start: 25 @36499 has 8 MA's), (34, 36448), (53, 36325), (63, 36250), (78, 36160), (87, 36088), (107, 35986), (129, 35836), (143, 35767), (149, 35707), (151, 35701), (157, 35644), (166, 35593), (171, 35566), (179, 35515), (185, 35467), (199, 35392), (200, 35389), (204, 35359), (207, 35341), (210, 35326),

Gene: GreenWeasel\_52 Start: 35757, Stop: 34504, Start Num: 17

Candidate Starts for GreenWeasel\_52:

(Start: 17 @35757 has 3 MA's), (Start: 25 @35715 has 8 MA's), (33, 35673), (39, 35625), (65, 35451), (68, 35439), (82, 35325), (89, 35277), (91, 35268), (106, 35175), (112, 35154), (113, 35151), (119, 35112), (123, 35097), (132, 34986), (135, 34971), (137, 34968), (146, 34914), (147, 34911), (154, 34845), (160, 34806), (162, 34794), (170, 34749), (179, 34695), (184, 34653), (192, 34611), (196, 34590), (198, 34581), (209, 34515),

Gene: HFrancette\_25 Start: 19616, Stop: 20866, Start Num: 18

Candidate Starts for HFrancette\_25:

(1, 19409), (2, 19427), (5, 19499), (12, 19586), (Start: 18 @19616 has 8 MA's), (31, 19673), (35, 19712), (Start: 38 @19733 has 2 MA's), (41, 19748), (42, 19757), (44, 19778), (47, 19796), (53, 19823), (58, 19865), (59, 19877), (67, 19928), (88, 20078), (95, 20123), (112, 20210), (119, 20252), (126, 20321), (128, 20345), (131, 20378), (154, 20516), (157, 20540), (161, 20561), (162, 20567), (169, 20606), (198, 20780),

Gene: Haizum\_52 Start: 37022, Stop: 35790, Start Num: 27

Candidate Starts for Haizum\_52:

(8, 37109), (23, 37037), (Start: 27 @37022 has 18 MA's), (58, 36818), (66, 36764), (70, 36740), (73, 36719), (74, 36710), (93, 36560), (103, 36509), (105, 36494), (127, 36353), (129, 36326), (132, 36296), (148, 36215), (156, 36140), (166, 36083), (171, 36056), (181, 35972), (182, 35969), (184, 35945), (194, 35888), (198, 35873), (204, 35828), (205, 35819),

Gene: Hank144\_53 Start: 37072, Stop: 35861, Start Num: 19

Candidate Starts for Hank144\_53:

(Start: 19 @37072 has 1 MA's), (Start: 25 @37036 has 8 MA's), (34, 36985), (53, 36862), (56, 36844), (60, 36805), (78, 36700), (87, 36628), (95, 36595), (97, 36589), (99, 36580), (107, 36526), (129, 36376), (138, 36322), (143, 36307), (151, 36241), (157, 36184), (158, 36178), (162, 36157), (166, 36133), (170, 36112), (179, 36055), (185, 36007), (200, 35929), (204, 35899), (207, 35881), (208, 35878), (210, 35866),

Gene: Ignacio\_25 Start: 19616, Stop: 20866, Start Num: 18



Candidate Starts for Ignacio\_25:

(1, 19409), (2, 19427), (5, 19499), (12, 19586), (Start: 18 @19616 has 8 MA's), (31, 19673), (35, 19712), (Start: 38 @19733 has 2 MA's), (41, 19748), (42, 19757), (44, 19778), (47, 19796), (53, 19823), (58, 19865), (59, 19877), (67, 19928), (88, 20078), (95, 20123), (112, 20210), (119, 20252), (126, 20321), (128, 20345), (131, 20378), (154, 20516), (157, 20540), (161, 20561), (162, 20567), (169, 20606), (198, 20780),

Gene: Issmi\_52 Start: 37451, Stop: 36222, Start Num: 27

Candidate Starts for Issmi\_52:

(23, 37466), (Start: 27 @37451 has 18 MA's), (39, 37367), (66, 37193), (70, 37169), (71, 37166), (105, 36926), (113, 36896), (123, 36842), (130, 36734), (148, 36647), (156, 36572), (159, 36554), (166, 36515), (171, 36488), (173, 36473), (184, 36377), (194, 36320), (198, 36305), (204, 36260), (205, 36251),

Gene: Janus\_51 Start: 36839, Stop: 35661, Start Num: 25

Candidate Starts for Janus\_51:

(Start: 25 @36839 has 8 MA's), (34, 36788), (53, 36665), (63, 36590), (78, 36500), (87, 36428), (97, 36389), (107, 36326), (129, 36176), (143, 36107), (149, 36047), (151, 36041), (157, 35984), (164, 35951), (166, 35933), (171, 35906), (179, 35855), (185, 35807), (200, 35729), (204, 35699), (207, 35681), (208, 35678), (210, 35666),

Gene: Loofah\_54 Start: 37605, Stop: 36373, Start Num: 27

Candidate Starts for Loofah\_54:

(Start: 27 @37605 has 18 MA's), (Start: 38 @37524 has 2 MA's), (66, 37344), (70, 37320), (105, 37077), (110, 37056), (123, 36993), (148, 36798), (156, 36723), (166, 36666), (171, 36639), (184, 36528), (194, 36471), (198, 36456), (204, 36411), (205, 36402),

Gene: Nishikigoi\_52 Start: 37022, Stop: 35790, Start Num: 27

Candidate Starts for Nishikigoi\_52:

(8, 37109), (23, 37037), (Start: 27 @37022 has 18 MA's), (58, 36818), (66, 36764), (70, 36740), (73, 36719), (74, 36710), (93, 36560), (103, 36509), (105, 36494), (127, 36353), (129, 36326), (132, 36296), (148, 36215), (156, 36140), (166, 36083), (171, 36056), (181, 35972), (182, 35969), (184, 35945), (194, 35888), (198, 35873), (204, 35828), (205, 35819),

Gene: OnionKnight\_26 Start: 19960, Stop: 21210, Start Num: 18

Candidate Starts for OnionKnight\_26:

(Start: 18 @19960 has 8 MA's), (Start: 27 @19999 has 18 MA's), (34, 20044), (46, 20137), (47, 20140), (48, 20143), (53, 20167), (57, 20203), (64, 20251), (88, 20422), (102, 20503), (108, 20539), (112, 20554), (137, 20743), (150, 20824), (154, 20860), (157, 20884), (160, 20899), (164, 20917), (167, 20938), (172, 20965), (206, 21184),

Gene: Pablito\_51 Start: 36673, Stop: 35438, Start Num: 27

Candidate Starts for Pablito\_51:

(7, 36802), (Start: 27 @36673 has 18 MA's), (34, 36625), (39, 36586), (49, 36529), (63, 36433), (66, 36412), (81, 36292), (95, 36202), (105, 36142), (110, 36121), (117, 36082), (123, 36058), (127, 36001), (138, 35920), (143, 35905), (148, 35863), (156, 35788), (166, 35731), (171, 35704), (173, 35689), (178, 35641), (184, 35593), (194, 35536), (198, 35521), (204, 35476), (205, 35467),

Gene: Paedore\_53 Start: 37509, Stop: 36358, Start Num: 38

Candidate Starts for Paedore\_53:

(Start: 27 @37590 has 18 MA's), (Start: 38 @37509 has 2 MA's), (66, 37329), (70, 37305), (105, 37062), (110, 37041), (123, 36978), (148, 36783), (156, 36708), (166, 36651), (184, 36513), (194, 36456), (198, 36441), (204, 36396), (205, 36387),

Gene: Paolo\_53 Start: 37580, Stop: 36351, Start Num: 27

Candidate Starts for Paolo\_53:

(23, 37595), (Start: 27 @37580 has 18 MA's), (39, 37496), (66, 37322), (70, 37298), (71, 37295), (105, 37055), (113, 37025), (115, 37001), (123, 36971), (148, 36776), (156, 36701), (159, 36683), (166, 36644), (171, 36617), (184, 36506), (194, 36449), (198, 36434), (204, 36389), (205, 36380),

Gene: PapayaSalad\_29 Start: 20152, Stop: 21375, Start Num: 16

Candidate Starts for PapayaSalad\_29:

(Start: 16 @20152 has 1 MA's), (Start: 22 @20185 has 1 MA's), (46, 20338), (55, 20374), (76, 20515), (92, 20614), (94, 20626), (96, 20632), (104, 20683), (105, 20689), (109, 20704), (133, 20890), (139, 20908), (150, 20986), (155, 21031), (191, 21262), (207, 21355), (209, 21364),

Gene: Piccadilly\_24 Start: 18938, Stop: 20188, Start Num: 18

Candidate Starts for Piccadilly\_24:

(12, 18908), (Start: 18 @18938 has 8 MA's), (31, 18995), (35, 19034), (Start: 38 @19055 has 2 MA's), (41, 19070), (42, 19079), (44, 19100), (47, 19118), (58, 19187), (59, 19199), (88, 19400), (95, 19445), (112, 19532), (119, 19574), (126, 19643), (128, 19667), (131, 19700), (154, 19838), (157, 19862), (161, 19883), (162, 19889), (169, 19928), (198, 20102),

Gene: Puginator\_53 Start: 37626, Stop: 36397, Start Num: 27

Candidate Starts for Puginator\_53:

(23, 37641), (Start: 27 @37626 has 18 MA's), (39, 37542), (66, 37368), (70, 37344), (71, 37341), (103, 37116), (105, 37101), (113, 37071), (115, 37047), (123, 37017), (148, 36822), (156, 36747), (159, 36729), (166, 36690), (171, 36663), (184, 36552), (194, 36495), (198, 36480), (204, 36435), (205, 36426),

Gene: R4\_52 Start: 37457, Stop: 36282, Start Num: 25

Candidate Starts for R4\_52:

(Start: 25 @37457 has 8 MA's), (34, 37406), (Start: 38 @37373 has 2 MA's), (53, 37283), (66, 37193), (87, 37049), (99, 37001), (107, 36947), (138, 36743), (149, 36668), (157, 36605), (166, 36554), (171, 36527), (185, 36428), (198, 36362), (204, 36320), (210, 36287),

Gene: SPB78\_26 Start: 21757, Stop: 22989, Start Num: 24

Candidate Starts for SPB78\_26:

(3, 21550), (4, 21595), (10, 21673), (Start: 18 @21727 has 8 MA's), (24, 21757), (28, 21775), (43, 21889), (46, 21913), (62, 22015), (83, 22171), (85, 22174), (97, 22255), (101, 22279), (112, 22336), (144, 22543), (157, 22657), (158, 22663), (160, 22672), (167, 22711), (171, 22735), (174, 22753), (179, 22792), (180, 22795), (185, 22840), (189, 22855), (198, 22906), (200, 22918), (203, 22939), (208, 22972), (209, 22978),

Gene: SqueakyClean\_50 Start: 36929, Stop: 35751, Start Num: 25

Candidate Starts for SqueakyClean\_50:

(Start: 25 @36929 has 8 MA's), (34, 36878), (53, 36755), (63, 36680), (78, 36590), (87, 36518), (97, 36479), (107, 36416), (129, 36266), (143, 36197), (149, 36137), (151, 36131), (157, 36074), (166, 36023), (171, 35996), (179, 35945), (185, 35897), (199, 35822), (200, 35819), (204, 35789), (207, 35771), (210, 35756),

Gene: Tefunt\_52 Start: 37024, Stop: 35792, Start Num: 27

Candidate Starts for Tefunt\_52:

(8, 37111), (23, 37039), (Start: 27 @37024 has 18 MA's), (66, 36766), (70, 36742), (73, 36721), (74, 36712), (93, 36562), (103, 36511), (105, 36496), (127, 36355), (129, 36328), (132, 36298), (148, 36217), (166, 36085), (171, 36058), (181, 35974), (182, 35971), (184, 35947), (194, 35890), (198,

35875), (204, 35830), (205, 35821),

Gene: Thestral\_54 Start: 38424, Stop: 37195, Start Num: 27

Candidate Starts for Thestral\_54:

(6, 38544), (23, 38439), (Start: 27 @38424 has 18 MA's), (39, 38340), (66, 38166), (70, 38142), (71, 38139), (103, 37914), (105, 37899), (113, 37869), (123, 37815), (148, 37620), (156, 37545), (159, 37527), (166, 37488), (171, 37461), (184, 37350), (194, 37293), (198, 37278), (204, 37233), (205, 37224),

Gene: TinaBelcher\_52 Start: 38372, Stop: 37143, Start Num: 27

Candidate Starts for TinaBelcher\_52:

(23, 38387), (Start: 27 @38372 has 18 MA's), (39, 38288), (66, 38114), (70, 38090), (71, 38087), (103, 37862), (105, 37847), (113, 37817), (123, 37763), (148, 37568), (156, 37493), (159, 37475), (166, 37436), (171, 37409), (184, 37298), (194, 37241), (198, 37226), (204, 37181), (205, 37172),

Gene: Triumph\_53 Start: 36977, Stop: 35799, Start Num: 25

Candidate Starts for Triumph\_53:

(Start: 25 @36977 has 8 MA's), (34, 36926), (45, 36839), (53, 36803), (63, 36728), (78, 36638), (87, 36566), (97, 36527), (107, 36464), (129, 36314), (138, 36260), (143, 36245), (149, 36185), (151, 36179), (157, 36122), (166, 36071), (171, 36044), (179, 35993), (185, 35945), (199, 35870), (200, 35867), (204, 35837), (207, 35819), (210, 35804),

Gene: TrvxScott\_51 Start: 38418, Stop: 37189, Start Num: 27

Candidate Starts for TrvxScott\_51:

(6, 38538), (23, 38433), (Start: 27 @38418 has 18 MA's), (39, 38334), (66, 38160), (70, 38136), (71, 38133), (103, 37908), (105, 37893), (113, 37863), (123, 37809), (148, 37614), (156, 37539), (159, 37521), (166, 37482), (171, 37455), (184, 37344), (194, 37287), (198, 37272), (204, 37227), (205, 37218),

Gene: VWB\_26 Start: 22434, Stop: 23615, Start Num: 22

Candidate Starts for VWB\_26:

(Start: 22 @22434 has 1 MA's), (37, 22518), (40, 22539), (54, 22614), (61, 22662), (77, 22770), (108, 22962), (122, 23031), (136, 23157), (175, 23388), (177, 23412), (188, 23481), (204, 23580),

Gene: Vash\_50 Start: 36353, Stop: 37594, Start Num: 26

Candidate Starts for Vash\_50:

(Start: 26 @36353 has 2 MA's), (29, 36365), (34, 36404), (36, 36419), (53, 36521), (66, 36623), (69, 36638), (71, 36650), (84, 36752), (86, 36764), (93, 36824), (98, 36842), (100, 36851), (105, 36890), (123, 36974), (124, 36986), (125, 37022), (129, 37058), (132, 37088), (138, 37112), (148, 37169), (151, 37193), (152, 37208), (158, 37256), (162, 37277), (166, 37301), (176, 37361), (178, 37391), (181, 37412), (187, 37451), (194, 37496), (198, 37511), (204, 37556), (205, 37565),

Gene: Zainub\_53 Start: 37555, Stop: 36326, Start Num: 27

Candidate Starts for Zainub\_53:

(23, 37570), (Start: 27 @37555 has 18 MA's), (39, 37471), (66, 37297), (70, 37273), (71, 37270), (103, 37045), (105, 37030), (113, 37000), (115, 36976), (123, 36946), (148, 36751), (156, 36676), (159, 36658), (166, 36619), (171, 36592), (184, 36481), (194, 36424), (198, 36409), (204, 36364), (205, 36355),

Gene: phiHau3\_52 Start: 35720, Stop: 34467, Start Num: 17

Candidate Starts for phiHau3\_52:

(Start: 17 @35720 has 3 MA's), (Start: 25 @35678 has 8 MA's), (33, 35636), (39, 35588), (65, 35414), (68, 35402), (82, 35288), (112, 35117), (119, 35075), (123, 35060), (132, 34949), (135, 34934), (137,

34931), (146, 34877), (147, 34874), (154, 34808), (157, 34784), (162, 34757), (170, 34712), (179, 34658), (184, 34616), (192, 34574), (198, 34544), (209, 34478),