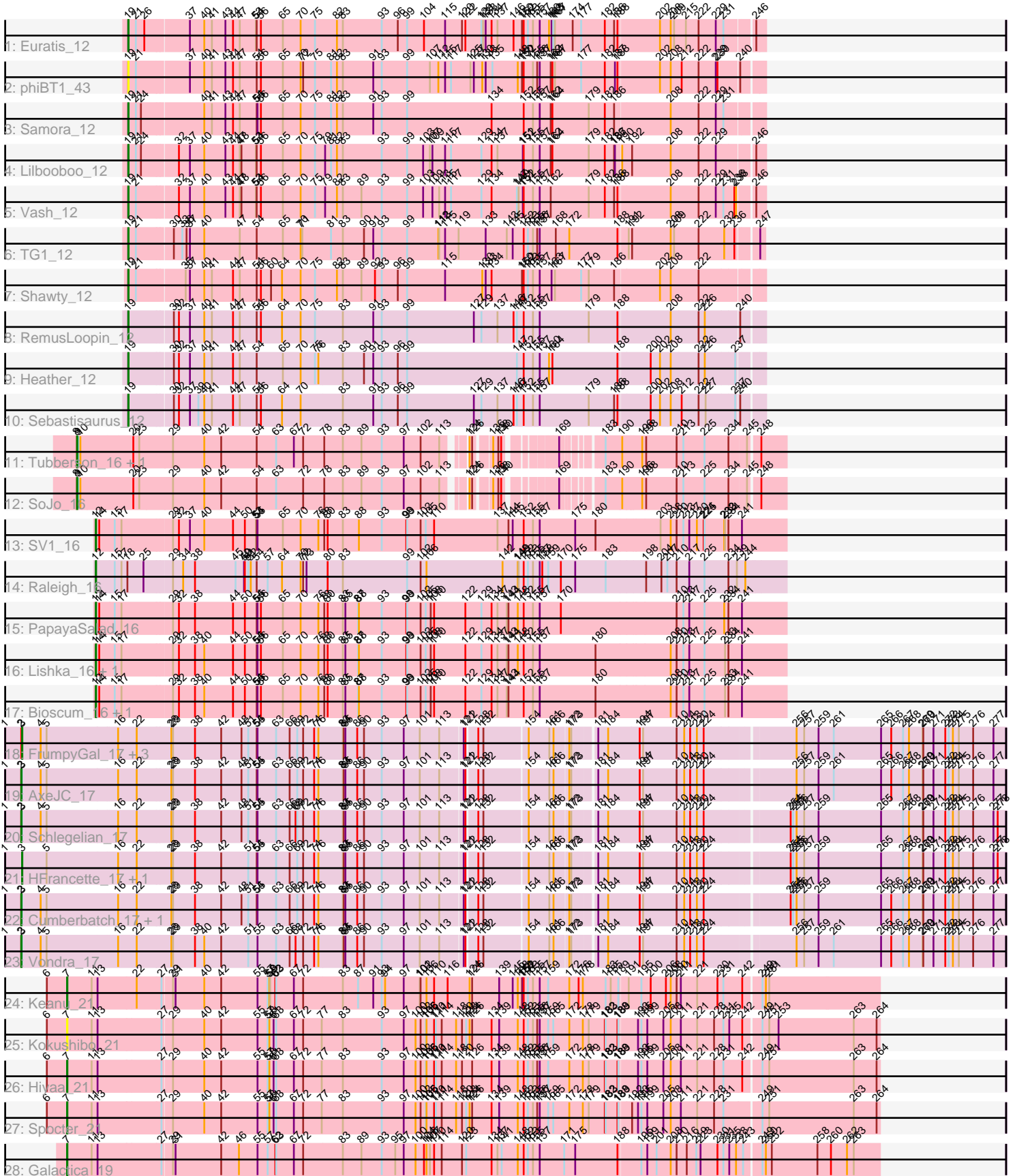


Pham 296747



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 296747 Report

This analysis was run 04/25/26 on database version 644.

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 296747 has 36 members, 3 are drafts.

Phages represented in each track:

- Track 1 : Euratis_12
- Track 2 : phiBT1_43
- Track 3 : Samora_12
- Track 4 : Lilbooboo_12
- Track 5 : Vash_12
- Track 6 : TG1_12
- Track 7 : Shawty_12
- Track 8 : RemusLoopin_12
- Track 9 : Heather_12
- Track 10 : Sebastisaurus_12
- Track 11 : Tubberson_16, DaRealMyers_16
- Track 12 : SoJo_16
- Track 13 : SV1_16
- Track 14 : Raleigh_16
- Track 15 : PapayaSalad_16
- Track 16 : Lishka_16, Austintatious_16
- Track 17 : Bioscum_16, Ididsumtinwong_16
- Track 18 : FrumpyGal_17, Eastland_17, Piccadilly_17, Eklok_17
- Track 19 : AxeJC_17
- Track 20 : Schlegelian_17
- Track 21 : HFrancette_17, Ignacio_17
- Track 22 : Cumberbatch_17, ArizonaGT_17
- Track 23 : Vondra_17
- Track 24 : Keanu_21
- Track 25 : Kokushibo_21
- Track 26 : Hiyaa_21
- Track 27 : Spocter_21
- Track 28 : Galactica_19

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

The start number called the most often in the published annotations is 19, it was called in 9 of the 33 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Euratis_12, Heather_12, Lilbooboo_12, RemusLoopin_12, Samora_12, Sebastisaurus_12, Shawty_12, TG1_12, Vash_12, phiBT1_43,

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

-

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

- ArizonaGT_17, Austintatious_16, AxeJC_17, Bioscum_16, Cumberbatch_17, DaRealMyers_16, Eastland_17, Eklok_17, FrumpyGal_17, Galactica_19, HFrancette_17, Hiyaa_21, Ididsumtinwong_16, Ignacio_17, Keanu_21, Kokushibo_21, Lishka_16, PapayaSalad_16, Piccadilly_17, Raleigh_16, SV1_16, Schlegelian_17, SoJo_16, Spocter_21, Tubberson_16, Vondra_17,

Summary by start number:

Start 2:

- Found in 9 of 36 (25.0%) of genes in pham
- Manual Annotations of this start: 5 of 33
- Called 55.6% of time when present
- Phage (with cluster) where this start called: ArizonaGT_17 (BP), AxeJC_17 (BP), Cumberbatch_17 (BP), Schlegelian_17 (BP), Vondra_17 (BP),

Start 3:

- Found in 11 of 36 (30.6%) of genes in pham
- Manual Annotations of this start: 6 of 33
- Called 54.5% of time when present
- Phage (with cluster) where this start called: Eastland_17 (BP), Eklok_17 (BP), FrumpyGal_17 (BP), HFrancette_17 (BP), Ignacio_17 (BP), Piccadilly_17 (BP),

Start 7:

- Found in 5 of 36 (13.9%) of genes in pham
- Manual Annotations of this start: 4 of 33
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Galactica_19 (BQ), Hiyaa_21 (BQ), Keanu_21 (BQ), Kokushibo_21 (BQ), Spocter_21 (BQ),

Start 8:

- Found in 3 of 36 (8.3%) of genes in pham
- Manual Annotations of this start: 2 of 33
- Called 100.0% of time when present
- Phage (with cluster) where this start called: DaRealMyers_16 (BC1), SoJo_16 (BC1), Tubberson_16 (BC1),

Start 12:

- Found in 7 of 36 (19.4%) of genes in pham
- Manual Annotations of this start: 7 of 33
- Called 100.0% of time when present

- Phage (with cluster) where this start called: Austintatious_16 (BC3), Bioscum_16 (BC3), Ididsumtinwong_16 (BC3), Lishka_16 (BC3), PapayaSalad_16 (BC3), Raleigh_16 (BC2), SV1_16 (BC1),

Start 19:

- Found in 10 of 36 (27.8%) of genes in pham
- Manual Annotations of this start: 9 of 33
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Euratis_12 (BB1), Heather_12 (BB2), Lilbooboo_12 (BB1), RemusLoopin_12 (BB2), Samora_12 (BB1), Sebastisaurus_12 (BB2), Shawty_12 (BB1), TG1_12 (BB1), Vash_12 (BB1), phiBT1_43 (BB1),

Summary by clusters:

There are 7 clusters represented in this pham: BQ, BB2, BP, BB1, BC1, BC2, BC3,

Info for manual annotations of cluster BB1:

- Start number 19 was manually annotated 6 times for cluster BB1.

Info for manual annotations of cluster BB2:

- Start number 19 was manually annotated 3 times for cluster BB2.

Info for manual annotations of cluster BC1:

- Start number 8 was manually annotated 2 times for cluster BC1.
- Start number 12 was manually annotated 1 time for cluster BC1.

Info for manual annotations of cluster BC2:

- Start number 12 was manually annotated 1 time for cluster BC2.

Info for manual annotations of cluster BC3:

- Start number 12 was manually annotated 5 times for cluster BC3.

Info for manual annotations of cluster BP:

- Start number 2 was manually annotated 5 times for cluster BP.
- Start number 3 was manually annotated 6 times for cluster BP.

Info for manual annotations of cluster BQ:

- Start number 7 was manually annotated 4 times for cluster BQ.

Gene Information:

Gene: ArizonaGT_17 Start: 9962, Stop: 13312, Start Num: 2

Candidate Starts for ArizonaGT_17:

(1, 9905), (Start: 2 @9962 has 5 MA's), (Start: 3 @9965 has 6 MA's), (4, 10031), (5, 10052), (16, 10298), (22, 10364), (28, 10484), (29, 10490), (38, 10568), (42, 10661), (48, 10733), (51, 10757), (54, 10787), (55, 10790), (63, 10856), (66, 10904), (69, 10931), (72, 10952), (74, 10991), (76, 11006), (83, 11090), (84, 11093), (85, 11099), (86, 11141), (90, 11165), (93, 11228), (97, 11306), (101, 11363), (113, 11432), (121, 11510), (122, 11516), (128, 11546), (132, 11564), (154, 11708), (161, 11774), (166, 11789), (172, 11837), (173, 11840), (181, 11909), (184, 11942), (194, 12053), (197, 12065), (210, 12182), (214, 12209), (218, 12230), (220, 12254), (224, 12278), (254, 12548), (255, 12557), (256, 12569), (257, 12596), (259, 12647), (265, 12869), (266, 12905), (267, 12947), (268, 12968),

(269, 13016), (270, 13019), (271, 13055), (272, 13097), (273, 13109), (274, 13124), (275, 13145), (276, 13196), (277, 13268),

Gene: Austintatious_16 Start: 9780, Stop: 12197, Start Num: 12

Candidate Starts for Austintatious_16:

(Start: 12 @9780 has 7 MA's), (14, 9792), (15, 9846), (17, 9867), (29, 10041), (32, 10062), (38, 10119), (40, 10152), (44, 10254), (50, 10296), (54, 10338), (55, 10341), (56, 10353), (65, 10431), (70, 10494), (76, 10557), (78, 10575), (80, 10587), (83, 10641), (85, 10650), (87, 10695), (88, 10698), (93, 10779), (98, 10866), (99, 10869), (102, 10917), (105, 10935), (108, 10953), (110, 10965), (122, 11076), (129, 11133), (134, 11169), (137, 11190), (143, 11223), (144, 11229), (148, 11262), (152, 11283), (155, 11316), (157, 11340), (180, 11538), (208, 11796), (210, 11817), (213, 11841), (217, 11862), (225, 11916), (233, 11982), (234, 11994), (241, 12039),

Gene: AxeJC_17 Start: 9978, Stop: 13328, Start Num: 2

Candidate Starts for AxeJC_17:

(1, 9921), (Start: 2 @9978 has 5 MA's), (Start: 3 @9981 has 6 MA's), (4, 10047), (5, 10068), (16, 10314), (22, 10380), (28, 10500), (29, 10506), (38, 10584), (42, 10677), (48, 10749), (51, 10773), (54, 10803), (55, 10806), (63, 10872), (66, 10920), (69, 10947), (72, 10968), (74, 11007), (76, 11022), (83, 11106), (84, 11109), (85, 11115), (86, 11157), (90, 11181), (93, 11244), (97, 11322), (101, 11379), (113, 11448), (121, 11526), (122, 11532), (128, 11562), (132, 11580), (154, 11724), (161, 11790), (166, 11805), (172, 11853), (173, 11856), (181, 11925), (184, 11958), (194, 12069), (197, 12081), (210, 12198), (214, 12225), (218, 12246), (220, 12270), (224, 12294), (256, 12585), (257, 12612), (259, 12663), (261, 12717), (265, 12885), (266, 12921), (267, 12963), (268, 12984), (269, 13032), (270, 13035), (271, 13071), (272, 13113), (273, 13125), (274, 13140), (275, 13161), (276, 13212), (277, 13284),

Gene: Bioscum_16 Start: 9816, Stop: 12233, Start Num: 12

Candidate Starts for Bioscum_16:

(Start: 12 @9816 has 7 MA's), (14, 9828), (15, 9882), (17, 9903), (29, 10077), (32, 10098), (38, 10155), (40, 10188), (44, 10290), (50, 10332), (54, 10374), (55, 10377), (56, 10389), (65, 10467), (70, 10530), (76, 10593), (78, 10611), (80, 10623), (83, 10677), (85, 10686), (87, 10731), (88, 10734), (93, 10815), (98, 10902), (99, 10905), (102, 10953), (105, 10971), (108, 10989), (110, 11001), (122, 11112), (129, 11169), (134, 11205), (137, 11226), (143, 11259), (144, 11265), (152, 11319), (155, 11352), (157, 11376), (180, 11574), (208, 11832), (210, 11853), (213, 11877), (217, 11898), (225, 11952), (233, 12018), (234, 12030), (241, 12075),

Gene: Cumberbatch_17 Start: 9962, Stop: 13312, Start Num: 2

Candidate Starts for Cumberbatch_17:

(1, 9905), (Start: 2 @9962 has 5 MA's), (Start: 3 @9965 has 6 MA's), (4, 10031), (5, 10052), (16, 10298), (22, 10364), (28, 10484), (29, 10490), (38, 10568), (42, 10661), (48, 10733), (51, 10757), (54, 10787), (55, 10790), (63, 10856), (66, 10904), (69, 10931), (72, 10952), (74, 10991), (76, 11006), (83, 11090), (84, 11093), (85, 11099), (86, 11141), (90, 11165), (93, 11228), (97, 11306), (101, 11363), (113, 11432), (121, 11510), (122, 11516), (128, 11546), (132, 11564), (154, 11708), (161, 11774), (166, 11789), (172, 11837), (173, 11840), (181, 11909), (184, 11942), (194, 12053), (197, 12065), (210, 12182), (214, 12209), (218, 12230), (220, 12254), (224, 12278), (254, 12548), (255, 12557), (256, 12569), (257, 12596), (259, 12647), (265, 12869), (266, 12905), (267, 12947), (268, 12968), (269, 13016), (270, 13019), (271, 13055), (272, 13097), (273, 13109), (274, 13124), (275, 13145), (276, 13196), (277, 13268),

Gene: DaRealMyers_16 Start: 10050, Stop: 12278, Start Num: 8

Candidate Starts for DaRealMyers_16:

(Start: 8 @10050 has 2 MA's), (9, 10056), (10, 10062), (20, 10239), (23, 10260), (29, 10377), (40, 10488), (42, 10548), (54, 10674), (63, 10743), (67, 10806), (72, 10839), (78, 10914), (83, 10977), (89,

11043), (93, 11115), (97, 11193), (102, 11253), (113, 11319), (124, 11373), (126, 11382), (136, 11427), (138, 11445), (140, 11451), (169, 11586), (183, 11685), (190, 11742), (196, 11808), (198, 11820), (210, 11928), (213, 11952), (225, 12027), (234, 12108), (245, 12159), (248, 12189),

Gene: Eastland_17 Start: 9966, Stop: 13313, Start Num: 3

Candidate Starts for Eastland_17:

(1, 9906), (Start: 2 @9963 has 5 MA's), (Start: 3 @9966 has 6 MA's), (4, 10032), (5, 10053), (16, 10299), (22, 10365), (28, 10485), (29, 10491), (38, 10569), (42, 10662), (48, 10734), (51, 10758), (54, 10788), (55, 10791), (63, 10857), (66, 10905), (69, 10932), (72, 10953), (74, 10992), (76, 11007), (83, 11091), (84, 11094), (85, 11100), (86, 11142), (90, 11166), (93, 11229), (97, 11307), (101, 11364), (113, 11433), (121, 11511), (122, 11517), (128, 11547), (132, 11565), (154, 11709), (161, 11775), (166, 11790), (172, 11838), (173, 11841), (181, 11910), (184, 11943), (194, 12054), (197, 12066), (210, 12183), (214, 12210), (218, 12231), (220, 12255), (224, 12279), (256, 12570), (257, 12597), (259, 12648), (261, 12702), (265, 12870), (266, 12906), (267, 12948), (268, 12969), (269, 13017), (270, 13020), (271, 13056), (272, 13098), (273, 13110), (274, 13125), (275, 13146), (276, 13197), (277, 13269),

Gene: Eklok_17 Start: 9981, Stop: 13328, Start Num: 3

Candidate Starts for Eklok_17:

(1, 9921), (Start: 2 @9978 has 5 MA's), (Start: 3 @9981 has 6 MA's), (4, 10047), (5, 10068), (16, 10314), (22, 10380), (28, 10500), (29, 10506), (38, 10584), (42, 10677), (48, 10749), (51, 10773), (54, 10803), (55, 10806), (63, 10872), (66, 10920), (69, 10947), (72, 10968), (74, 11007), (76, 11022), (83, 11106), (84, 11109), (85, 11115), (86, 11157), (90, 11181), (93, 11244), (97, 11322), (101, 11379), (113, 11448), (121, 11526), (122, 11532), (128, 11562), (132, 11580), (154, 11724), (161, 11790), (166, 11805), (172, 11853), (173, 11856), (181, 11925), (184, 11958), (194, 12069), (197, 12081), (210, 12198), (214, 12225), (218, 12246), (220, 12270), (224, 12294), (256, 12585), (257, 12612), (259, 12663), (261, 12717), (265, 12885), (266, 12921), (267, 12963), (268, 12984), (269, 13032), (270, 13035), (271, 13071), (272, 13113), (273, 13125), (274, 13140), (275, 13161), (276, 13212), (277, 13284),

Gene: Euratis_12 Start: 8185, Stop: 10374, Start Num: 19

Candidate Starts for Euratis_12:

(Start: 19 @8185 has 9 MA's), (21, 8212), (26, 8242), (37, 8392), (40, 8443), (41, 8470), (43, 8518), (44, 8545), (47, 8569), (53, 8626), (54, 8629), (56, 8644), (65, 8722), (70, 8785), (75, 8836), (82, 8911), (83, 8932), (93, 9070), (96, 9127), (99, 9160), (104, 9220), (115, 9295), (120, 9355), (122, 9367), (129, 9424), (131, 9430), (133, 9439), (134, 9460), (137, 9481), (146, 9538), (150, 9568), (152, 9574), (153, 9589), (155, 9607), (157, 9631), (160, 9664), (163, 9673), (165, 9679), (167, 9685), (174, 9748), (177, 9778), (182, 9862), (186, 9895), (188, 9907), (202, 10048), (208, 10081), (209, 10093), (215, 10132), (222, 10177), (229, 10231), (231, 10255), (246, 10342),

Gene: FrumpyGal_17 Start: 9966, Stop: 13313, Start Num: 3

Candidate Starts for FrumpyGal_17:

(1, 9906), (Start: 2 @9963 has 5 MA's), (Start: 3 @9966 has 6 MA's), (4, 10032), (5, 10053), (16, 10299), (22, 10365), (28, 10485), (29, 10491), (38, 10569), (42, 10662), (48, 10734), (51, 10758), (54, 10788), (55, 10791), (63, 10857), (66, 10905), (69, 10932), (72, 10953), (74, 10992), (76, 11007), (83, 11091), (84, 11094), (85, 11100), (86, 11142), (90, 11166), (93, 11229), (97, 11307), (101, 11364), (113, 11433), (121, 11511), (122, 11517), (128, 11547), (132, 11565), (154, 11709), (161, 11775), (166, 11790), (172, 11838), (173, 11841), (181, 11910), (184, 11943), (194, 12054), (197, 12066), (210, 12183), (214, 12210), (218, 12231), (220, 12255), (224, 12279), (256, 12570), (257, 12597), (259, 12648), (261, 12702), (265, 12870), (266, 12906), (267, 12948), (268, 12969), (269, 13017), (270, 13020), (271, 13056), (272, 13098), (273, 13110), (274, 13125), (275, 13146), (276, 13197), (277, 13269),

Gene: Galactica_19 Start: 14849, Stop: 17671, Start Num: 7

Candidate Starts for Galactica_19:

(Start: 7 @14849 has 4 MA's), (11, 14936), (13, 14957), (27, 15179), (29, 15212), (31, 15221), (42, 15383), (46, 15446), (55, 15512), (57, 15548), (62, 15575), (63, 15578), (67, 15641), (72, 15674), (83, 15812), (89, 15878), (93, 15950), (95, 15998), (97, 16028), (100, 16070), (104, 16100), (106, 16109), (107, 16121), (110, 16136), (114, 16163), (120, 16235), (123, 16250), (134, 16340), (137, 16361), (141, 16376), (148, 16433), (152, 16454), (153, 16469), (155, 16487), (157, 16511), (171, 16598), (175, 16637), (188, 16787), (195, 16862), (199, 16883), (201, 16916), (208, 16961), (210, 16982), (216, 17015), (219, 17048), (223, 17063), (230, 17117), (231, 17138), (235, 17159), (238, 17183), (243, 17207), (249, 17258), (250, 17270), (252, 17291), (258, 17453), (260, 17498), (262, 17555), (263, 17579),

Gene: HFrancette_17 Start: 9980, Stop: 13327, Start Num: 3

Candidate Starts for HFrancette_17:

(1, 9920), (Start: 3 @9980 has 6 MA's), (5, 10067), (16, 10313), (22, 10379), (28, 10499), (29, 10505), (38, 10583), (42, 10676), (51, 10772), (54, 10802), (55, 10805), (63, 10871), (66, 10919), (69, 10946), (72, 10967), (74, 11006), (76, 11021), (83, 11105), (84, 11108), (85, 11114), (86, 11156), (90, 11180), (93, 11243), (97, 11321), (101, 11378), (113, 11447), (121, 11525), (122, 11531), (128, 11561), (132, 11579), (154, 11723), (161, 11789), (166, 11804), (172, 11852), (173, 11855), (181, 11924), (184, 11957), (194, 12068), (197, 12080), (210, 12197), (214, 12224), (218, 12245), (220, 12269), (224, 12293), (254, 12563), (255, 12572), (256, 12584), (257, 12611), (259, 12662), (265, 12884), (267, 12962), (268, 12983), (269, 13031), (270, 13034), (271, 13070), (272, 13112), (273, 13124), (274, 13139), (275, 13160), (276, 13211), (277, 13283), (278, 13298),

Gene: Heather_12 Start: 8215, Stop: 10404, Start Num: 19

Candidate Starts for Heather_12:

(Start: 19 @8215 has 9 MA's), (30, 8365), (32, 8383), (37, 8422), (40, 8473), (41, 8500), (44, 8575), (47, 8599), (54, 8659), (65, 8752), (70, 8815), (75, 8866), (76, 8878), (83, 8962), (90, 9037), (91, 9070), (93, 9100), (96, 9157), (99, 9190), (147, 9580), (152, 9604), (155, 9637), (157, 9661), (160, 9694), (164, 9706), (188, 9937), (200, 10045), (202, 10078), (208, 10111), (222, 10207), (226, 10228), (237, 10324),

Gene: Hiyaa_21 Start: 15882, Stop: 18707, Start Num: 7

Candidate Starts for Hiyaa_21:

(6, 15810), (Start: 7 @15882 has 4 MA's), (11, 15969), (13, 15990), (27, 16212), (29, 16245), (40, 16356), (42, 16416), (55, 16545), (57, 16581), (58, 16587), (61, 16602), (63, 16611), (67, 16674), (72, 16707), (77, 16773), (83, 16845), (93, 16983), (97, 17061), (100, 17103), (102, 17121), (105, 17139), (106, 17142), (110, 17169), (111, 17175), (114, 17196), (118, 17247), (120, 17268), (126, 17304), (134, 17373), (139, 17400), (148, 17466), (152, 17487), (153, 17502), (155, 17520), (156, 17535), (157, 17544), (159, 17574), (172, 17649), (178, 17697), (179, 17718), (182, 17775), (183, 17778), (188, 17820), (189, 17823), (193, 17883), (195, 17895), (199, 17916), (205, 17973), (208, 17994), (211, 18027), (221, 18084), (228, 18138), (231, 18171), (242, 18237), (249, 18291), (251, 18315), (263, 18615), (264, 18696),

Gene: Ididsumtinwong_16 Start: 9816, Stop: 12233, Start Num: 12

Candidate Starts for Ididsumtinwong_16:

(Start: 12 @9816 has 7 MA's), (14, 9828), (15, 9882), (17, 9903), (29, 10077), (32, 10098), (38, 10155), (40, 10188), (44, 10290), (50, 10332), (54, 10374), (55, 10377), (56, 10389), (65, 10467), (70, 10530), (76, 10593), (78, 10611), (80, 10623), (83, 10677), (85, 10686), (87, 10731), (88, 10734), (93, 10815), (98, 10902), (99, 10905), (102, 10953), (105, 10971), (108, 10989), (110, 11001), (122, 11112), (129, 11169), (134, 11205), (137, 11226), (143, 11259), (144, 11265), (152, 11319), (155, 11352), (157, 11376), (180, 11574), (208, 11832), (210, 11853), (213, 11877), (217, 11898), (225, 11952), (233, 12018), (234, 12030), (241, 12075),

Gene: Ignacio_17 Start: 9980, Stop: 13327, Start Num: 3

Candidate Starts for Ignacio_17:

(1, 9920), (Start: 3 @9980 has 6 MA's), (5, 10067), (16, 10313), (22, 10379), (28, 10499), (29, 10505), (38, 10583), (42, 10676), (51, 10772), (54, 10802), (55, 10805), (63, 10871), (66, 10919), (69, 10946), (72, 10967), (74, 11006), (76, 11021), (83, 11105), (84, 11108), (85, 11114), (86, 11156), (90, 11180), (93, 11243), (97, 11321), (101, 11378), (113, 11447), (121, 11525), (122, 11531), (128, 11561), (132, 11579), (154, 11723), (161, 11789), (166, 11804), (172, 11852), (173, 11855), (181, 11924), (184, 11957), (194, 12068), (197, 12080), (210, 12197), (214, 12224), (218, 12245), (220, 12269), (224, 12293), (254, 12563), (255, 12572), (256, 12584), (257, 12611), (259, 12662), (265, 12884), (267, 12962), (268, 12983), (269, 13031), (270, 13034), (271, 13070), (272, 13112), (273, 13124), (274, 13139), (275, 13160), (276, 13211), (277, 13283), (278, 13298),

Gene: Keanu_21 Start: 15925, Stop: 18747, Start Num: 7

Candidate Starts for Keanu_21:

(6, 15853), (Start: 7 @15925 has 4 MA's), (11, 16012), (13, 16033), (22, 16168), (27, 16255), (29, 16288), (31, 16297), (40, 16399), (42, 16459), (55, 16588), (57, 16624), (58, 16630), (59, 16633), (62, 16651), (63, 16654), (67, 16717), (72, 16750), (83, 16888), (87, 16942), (91, 16996), (93, 17026), (94, 17038), (97, 17104), (101, 17161), (102, 17164), (106, 17185), (110, 17212), (116, 17260), (124, 17338), (126, 17347), (139, 17443), (145, 17491), (148, 17509), (150, 17524), (151, 17527), (152, 17530), (153, 17545), (155, 17563), (157, 17587), (159, 17617), (172, 17692), (176, 17725), (178, 17740), (183, 17821), (185, 17839), (189, 17866), (191, 17893), (195, 17938), (200, 17971), (206, 18025), (208, 18037), (210, 18058), (211, 18070), (221, 18127), (230, 18193), (231, 18214), (242, 18280), (249, 18334), (250, 18346), (251, 18358),

Gene: Kokushibo_21 Start: 15897, Stop: 18722, Start Num: 7

Candidate Starts for Kokushibo_21:

(6, 15825), (Start: 7 @15897 has 4 MA's), (11, 15984), (13, 16005), (27, 16227), (29, 16260), (40, 16371), (42, 16431), (55, 16560), (57, 16596), (58, 16602), (61, 16617), (63, 16626), (67, 16689), (72, 16722), (77, 16788), (83, 16860), (93, 16998), (97, 17076), (100, 17118), (102, 17136), (105, 17154), (106, 17157), (110, 17184), (111, 17190), (114, 17211), (118, 17262), (120, 17283), (123, 17298), (124, 17310), (126, 17319), (134, 17388), (139, 17415), (148, 17481), (152, 17502), (153, 17517), (155, 17535), (156, 17550), (157, 17559), (159, 17589), (165, 17607), (172, 17664), (178, 17712), (179, 17733), (182, 17790), (183, 17793), (188, 17835), (189, 17838), (193, 17898), (195, 17910), (199, 17931), (205, 17988), (208, 18009), (211, 18042), (221, 18099), (228, 18153), (231, 18186), (235, 18207), (242, 18252), (249, 18306), (251, 18330), (253, 18363), (263, 18630), (264, 18711),

Gene: Lilbooboo_12 Start: 8195, Stop: 10384, Start Num: 19

Candidate Starts for Lilbooboo_12:

(Start: 19 @8195 has 9 MA's), (21, 8222), (24, 8240), (32, 8363), (37, 8402), (40, 8453), (43, 8528), (44, 8555), (47, 8579), (48, 8585), (53, 8636), (54, 8639), (56, 8654), (65, 8732), (70, 8795), (75, 8846), (79, 8879), (81, 8900), (82, 8921), (83, 8942), (93, 9080), (99, 9170), (103, 9227), (107, 9251), (109, 9260), (115, 9305), (117, 9326), (129, 9434), (134, 9470), (137, 9491), (151, 9581), (152, 9584), (155, 9617), (157, 9641), (162, 9680), (164, 9686), (179, 9815), (182, 9872), (186, 9905), (187, 9908), (190, 9926), (192, 9959), (208, 10091), (222, 10187), (229, 10241), (246, 10352),

Gene: Lishka_16 Start: 9780, Stop: 12197, Start Num: 12

Candidate Starts for Lishka_16:

(Start: 12 @9780 has 7 MA's), (14, 9792), (15, 9846), (17, 9867), (29, 10041), (32, 10062), (38, 10119), (40, 10152), (44, 10254), (50, 10296), (54, 10338), (55, 10341), (56, 10353), (65, 10431), (70, 10494), (76, 10557), (78, 10575), (80, 10587), (83, 10641), (85, 10650), (87, 10695), (88, 10698), (93, 10779), (98, 10866), (99, 10869), (102, 10917), (105, 10935), (108, 10953), (110, 10965), (122, 11076), (129, 11133), (134, 11169), (137, 11190), (143, 11223), (144, 11229), (148, 11262), (152, 11283), (155,

11316), (157, 11340), (180, 11538), (208, 11796), (210, 11817), (213, 11841), (217, 11862), (225, 11916), (233, 11982), (234, 11994), (241, 12039),

Gene: PapayaSalad_16 Start: 9786, Stop: 12203, Start Num: 12

Candidate Starts for PapayaSalad_16:

(Start: 12 @9786 has 7 MA's), (14, 9798), (15, 9852), (17, 9873), (29, 10047), (32, 10068), (38, 10125), (44, 10260), (50, 10302), (54, 10344), (55, 10347), (56, 10359), (65, 10437), (70, 10500), (76, 10563), (78, 10581), (80, 10593), (83, 10647), (85, 10656), (87, 10701), (88, 10704), (93, 10785), (98, 10872), (99, 10875), (102, 10923), (105, 10941), (108, 10959), (110, 10971), (122, 11082), (129, 11139), (134, 11175), (137, 11196), (143, 11229), (144, 11235), (148, 11268), (152, 11289), (155, 11322), (157, 11346), (170, 11421), (210, 11823), (213, 11847), (217, 11868), (225, 11922), (232, 11985), (234, 12000), (241, 12045),

Gene: Piccadilly_17 Start: 9965, Stop: 13312, Start Num: 3

Candidate Starts for Piccadilly_17:

(1, 9905), (Start: 2 @9962 has 5 MA's), (Start: 3 @9965 has 6 MA's), (4, 10031), (5, 10052), (16, 10298), (22, 10364), (28, 10484), (29, 10490), (38, 10568), (42, 10661), (48, 10733), (51, 10757), (54, 10787), (55, 10790), (63, 10856), (66, 10904), (69, 10931), (72, 10952), (74, 10991), (76, 11006), (83, 11090), (84, 11093), (85, 11099), (86, 11141), (90, 11165), (93, 11228), (97, 11306), (101, 11363), (113, 11432), (121, 11510), (122, 11516), (128, 11546), (132, 11564), (154, 11708), (161, 11774), (166, 11789), (172, 11837), (173, 11840), (181, 11909), (184, 11942), (194, 12053), (197, 12065), (210, 12182), (214, 12209), (218, 12230), (220, 12254), (224, 12278), (256, 12569), (257, 12596), (259, 12647), (261, 12701), (265, 12869), (266, 12905), (267, 12947), (268, 12968), (269, 13016), (270, 13019), (271, 13055), (272, 13097), (273, 13109), (274, 13124), (275, 13145), (276, 13196), (277, 13268),

Gene: Raleigh_16 Start: 10247, Stop: 12655, Start Num: 12

Candidate Starts for Raleigh_16:

(Start: 12 @10247 has 7 MA's), (15, 10313), (17, 10334), (18, 10355), (25, 10412), (29, 10508), (34, 10544), (38, 10586), (45, 10730), (49, 10760), (50, 10763), (51, 10775), (52, 10784), (54, 10805), (57, 10844), (64, 10895), (70, 10961), (72, 10970), (73, 10982), (80, 11054), (83, 11108), (99, 11336), (102, 11384), (106, 11405), (142, 11675), (148, 11729), (149, 11732), (152, 11750), (153, 11765), (155, 11783), (157, 11807), (158, 11816), (159, 11837), (170, 11882), (175, 11933), (183, 12041), (198, 12176), (204, 12230), (207, 12251), (210, 12284), (217, 12329), (225, 12383), (234, 12464), (239, 12491), (244, 12515),

Gene: RemusLoopin_12 Start: 8193, Stop: 10382, Start Num: 19

Candidate Starts for RemusLoopin_12:

(Start: 19 @8193 has 9 MA's), (30, 8343), (32, 8361), (37, 8400), (40, 8451), (41, 8478), (44, 8553), (47, 8577), (54, 8637), (56, 8652), (64, 8727), (70, 8793), (75, 8844), (83, 8940), (91, 9048), (93, 9078), (99, 9168), (127, 9405), (129, 9432), (137, 9489), (146, 9546), (147, 9558), (152, 9582), (155, 9615), (157, 9639), (179, 9813), (188, 9915), (208, 10089), (222, 10185), (226, 10206), (240, 10311),

Gene: SV1_16 Start: 10022, Stop: 12439, Start Num: 12

Candidate Starts for SV1_16:

(Start: 12 @10022 has 7 MA's), (14, 10034), (15, 10088), (17, 10109), (29, 10283), (32, 10304), (37, 10343), (40, 10394), (44, 10496), (50, 10538), (53, 10577), (54, 10580), (55, 10583), (65, 10673), (70, 10736), (76, 10799), (78, 10817), (80, 10829), (83, 10883), (88, 10940), (93, 11021), (98, 11108), (99, 11111), (102, 11159), (105, 11177), (110, 11207), (137, 11432), (144, 11471), (145, 11486), (152, 11525), (155, 11558), (157, 11582), (175, 11708), (180, 11780), (203, 12002), (208, 12038), (210, 12059), (213, 12083), (217, 12104), (220, 12131), (224, 12155), (225, 12158), (232, 12221), (233, 12224), (234, 12236), (241, 12281),

Gene: Samora_12 Start: 8227, Stop: 10419, Start Num: 19

Candidate Starts for Samora_12:

(Start: 19 @8227 has 9 MA's), (21, 8254), (24, 8272), (40, 8485), (41, 8512), (43, 8560), (44, 8587), (47, 8611), (54, 8671), (55, 8674), (56, 8686), (65, 8764), (70, 8827), (75, 8878), (81, 8932), (82, 8953), (83, 8974), (91, 9082), (93, 9112), (99, 9202), (134, 9502), (152, 9616), (155, 9649), (157, 9673), (162, 9712), (164, 9718), (179, 9847), (182, 9904), (186, 9937), (208, 10123), (222, 10219), (229, 10273), (231, 10297),

Gene: Schlegelian_17 Start: 9962, Stop: 13312, Start Num: 2

Candidate Starts for Schlegelian_17:

(1, 9905), (Start: 2 @9962 has 5 MA's), (Start: 3 @9965 has 6 MA's), (4, 10031), (5, 10052), (16, 10298), (22, 10364), (28, 10484), (29, 10490), (38, 10568), (42, 10661), (48, 10733), (51, 10757), (54, 10787), (55, 10790), (63, 10856), (66, 10904), (68, 10925), (69, 10931), (72, 10952), (74, 10991), (76, 11006), (83, 11090), (84, 11093), (85, 11099), (86, 11141), (90, 11165), (93, 11228), (97, 11306), (101, 11363), (113, 11432), (121, 11510), (122, 11516), (128, 11546), (132, 11564), (154, 11708), (161, 11774), (166, 11789), (172, 11837), (173, 11840), (181, 11909), (184, 11942), (194, 12053), (197, 12065), (210, 12182), (214, 12209), (218, 12230), (220, 12254), (224, 12278), (254, 12548), (255, 12557), (256, 12569), (257, 12596), (259, 12647), (265, 12869), (267, 12947), (268, 12968), (269, 13016), (270, 13019), (271, 13055), (272, 13097), (273, 13109), (274, 13124), (275, 13145), (276, 13196), (277, 13268), (278, 13283),

Gene: Sebastisaurus_12 Start: 8219, Stop: 10408, Start Num: 19

Candidate Starts for Sebastisaurus_12:

(Start: 19 @8219 has 9 MA's), (30, 8369), (32, 8387), (37, 8426), (39, 8456), (40, 8477), (41, 8504), (44, 8579), (47, 8603), (54, 8663), (56, 8678), (64, 8753), (70, 8819), (83, 8966), (91, 9074), (93, 9104), (96, 9161), (99, 9194), (127, 9431), (129, 9458), (137, 9515), (146, 9572), (147, 9584), (152, 9608), (155, 9641), (157, 9665), (179, 9839), (186, 9929), (188, 9941), (200, 10049), (202, 10082), (208, 10115), (212, 10151), (222, 10211), (227, 10235), (237, 10328), (240, 10337),

Gene: Shawty_12 Start: 8222, Stop: 10411, Start Num: 19

Candidate Starts for Shawty_12:

(Start: 19 @8222 has 9 MA's), (21, 8249), (35, 8414), (37, 8429), (40, 8480), (41, 8507), (44, 8582), (47, 8606), (54, 8666), (56, 8681), (60, 8717), (64, 8756), (70, 8822), (75, 8873), (82, 8948), (83, 8969), (89, 9035), (92, 9083), (93, 9107), (96, 9164), (99, 9197), (115, 9332), (130, 9464), (133, 9476), (134, 9497), (150, 9605), (152, 9611), (153, 9626), (155, 9644), (157, 9668), (163, 9710), (167, 9722), (177, 9815), (179, 9842), (186, 9932), (202, 10085), (208, 10118), (222, 10214),

Gene: SoJo_16 Start: 10050, Stop: 12278, Start Num: 8

Candidate Starts for SoJo_16:

(Start: 8 @10050 has 2 MA's), (9, 10056), (10, 10062), (20, 10239), (23, 10260), (29, 10377), (40, 10488), (42, 10548), (54, 10674), (63, 10743), (72, 10839), (78, 10914), (83, 10977), (89, 11043), (93, 11115), (97, 11193), (102, 11253), (113, 11319), (124, 11373), (126, 11382), (136, 11427), (138, 11445), (140, 11451), (169, 11586), (183, 11685), (190, 11742), (196, 11808), (198, 11820), (210, 11928), (213, 11952), (225, 12027), (234, 12108), (245, 12159), (248, 12189),

Gene: Spocter_21 Start: 15870, Stop: 18695, Start Num: 7

Candidate Starts for Spocter_21:

(6, 15798), (Start: 7 @15870 has 4 MA's), (11, 15957), (13, 15978), (27, 16200), (29, 16233), (40, 16344), (42, 16404), (55, 16533), (57, 16569), (58, 16575), (61, 16590), (63, 16599), (67, 16662), (72, 16695), (77, 16761), (83, 16833), (93, 16971), (97, 17049), (100, 17091), (102, 17109), (105, 17127), (106, 17130), (110, 17157), (111, 17163), (114, 17184), (118, 17235), (120, 17256), (123, 17271), (124, 17283), (126, 17292), (134, 17361), (139, 17388), (148, 17454), (152, 17475), (153, 17490), (155, 17508), (156, 17523), (157, 17532), (159, 17562), (165, 17580), (172, 17637), (178, 17685),

(179, 17706), (182, 17763), (183, 17766), (188, 17808), (189, 17811), (192, 17850), (193, 17871), (195, 17883), (199, 17904), (205, 17961), (208, 17982), (211, 18015), (221, 18072), (228, 18126), (231, 18159), (249, 18279), (251, 18303), (263, 18603), (264, 18684),

Gene: TG1_12 Start: 8190, Stop: 10379, Start Num: 19

Candidate Starts for TG1_12:

(Start: 19 @8190 has 9 MA's), (21, 8217), (30, 8340), (33, 8370), (36, 8385), (37, 8397), (40, 8448), (47, 8574), (54, 8634), (65, 8727), (70, 8790), (71, 8796), (81, 8895), (83, 8937), (90, 9012), (91, 9045), (93, 9075), (99, 9165), (112, 9276), (113, 9279), (115, 9300), (119, 9348), (133, 9444), (143, 9519), (145, 9540), (152, 9579), (153, 9594), (155, 9612), (156, 9627), (157, 9636), (168, 9693), (172, 9741), (188, 9912), (191, 9942), (192, 9954), (208, 10086), (209, 10098), (222, 10182), (232, 10263), (236, 10299), (247, 10362),

Gene: Tubberson_16 Start: 10050, Stop: 12278, Start Num: 8

Candidate Starts for Tubberson_16:

(Start: 8 @10050 has 2 MA's), (9, 10056), (10, 10062), (20, 10239), (23, 10260), (29, 10377), (40, 10488), (42, 10548), (54, 10674), (63, 10743), (67, 10806), (72, 10839), (78, 10914), (83, 10977), (89, 11043), (93, 11115), (97, 11193), (102, 11253), (113, 11319), (124, 11373), (126, 11382), (136, 11427), (138, 11445), (140, 11451), (169, 11586), (183, 11685), (190, 11742), (196, 11808), (198, 11820), (210, 11928), (213, 11952), (225, 12027), (234, 12108), (245, 12159), (248, 12189),

Gene: Vash_12 Start: 8200, Stop: 10392, Start Num: 19

Candidate Starts for Vash_12:

(Start: 19 @8200 has 9 MA's), (21, 8227), (32, 8368), (37, 8407), (40, 8458), (43, 8533), (44, 8560), (47, 8584), (48, 8590), (53, 8641), (54, 8644), (56, 8659), (65, 8737), (70, 8800), (75, 8851), (79, 8884), (82, 8926), (83, 8947), (89, 9013), (93, 9085), (99, 9175), (103, 9232), (109, 9265), (113, 9289), (115, 9310), (117, 9331), (129, 9439), (134, 9475), (147, 9565), (149, 9571), (151, 9586), (152, 9589), (155, 9622), (157, 9646), (162, 9685), (179, 9820), (182, 9877), (186, 9910), (188, 9922), (208, 10096), (222, 10192), (229, 10246), (231, 10270), (236, 10309), (238, 10315), (246, 10360),

Gene: Vondra_17 Start: 9974, Stop: 13324, Start Num: 2

Candidate Starts for Vondra_17:

(1, 9917), (Start: 2 @9974 has 5 MA's), (Start: 3 @9977 has 6 MA's), (4, 10043), (5, 10064), (16, 10310), (22, 10376), (28, 10496), (29, 10502), (38, 10580), (40, 10613), (42, 10673), (51, 10769), (55, 10802), (63, 10868), (66, 10916), (68, 10937), (72, 10964), (74, 11003), (76, 11018), (83, 11102), (84, 11105), (85, 11111), (86, 11153), (90, 11177), (93, 11240), (97, 11318), (101, 11375), (113, 11444), (121, 11522), (122, 11528), (128, 11558), (132, 11576), (154, 11720), (161, 11786), (166, 11801), (172, 11849), (173, 11852), (181, 11921), (184, 11954), (194, 12065), (197, 12077), (210, 12194), (214, 12221), (218, 12242), (220, 12266), (224, 12290), (256, 12581), (257, 12608), (259, 12659), (261, 12713), (265, 12881), (266, 12917), (267, 12959), (268, 12980), (269, 13028), (270, 13031), (271, 13067), (272, 13109), (273, 13121), (274, 13136), (275, 13157), (276, 13208), (277, 13280),

Gene: phiBT1_43 Start: 8225, Stop: 10414, Start Num: 19

Candidate Starts for phiBT1_43:

(Start: 19 @8225 has 9 MA's), (21, 8252), (37, 8432), (40, 8483), (41, 8510), (43, 8558), (44, 8585), (47, 8609), (54, 8669), (56, 8684), (65, 8762), (70, 8825), (72, 8834), (75, 8876), (81, 8930), (82, 8951), (83, 8972), (91, 9080), (93, 9110), (99, 9200), (107, 9281), (112, 9311), (115, 9335), (117, 9356), (125, 9425), (127, 9437), (130, 9467), (133, 9479), (135, 9503), (148, 9593), (150, 9608), (152, 9614), (155, 9647), (156, 9662), (157, 9671), (162, 9710), (164, 9716), (167, 9725), (177, 9818), (182, 9902), (187, 9938), (188, 9947), (202, 10088), (208, 10121), (212, 10157), (222, 10217), (229, 10271), (230, 10277), (240, 10343),