



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 170282 Report

This analysis was run 07/09/24 on database version 566.

Pham number 170282 has 23 members, 3 are drafts.

Phages represented in each track:

- Track 1 : Chocolat\_22, Kabreeze\_22, Scavito\_22, Conboy\_22, PrincessTrina\_22, Chipper1996\_220, Chubster\_22, RosiePosie\_22, EdgarPoe\_22, HumptyDumpty\_22
- Track 2 : MoyaNatalis\_22
- Track 3 : Colucci\_21
- Track 4 : JaNo\_22, Linus\_22, Mordred\_22, Tophat\_22, JayCookie\_22
- Track 5 : ArV1\_018
- Track 6 : KBurrousTX\_22
- Track 7 : Lymara\_22
- Track 8 : DrYang\_22
- Track 9 : Hirko\_18
- Track 10 : Vibaki\_19

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

The start number called the most often in the published annotations is 1, it was called in 12 of the 20 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Chipper1996\_220, Chocolat\_22, Chubster\_22, Colucci\_21, Conboy\_22, EdgarPoe\_22, HumptyDumpty\_22, KBurrousTX\_22, Kabreeze\_22, PrincessTrina\_22, RosiePosie\_22, Scavito\_22,

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

- ArV1\_018, JaNo\_22, JayCookie\_22, Linus\_22, Lymara\_22, Mordred\_22, MoyaNatalis\_22, Tophat\_22,

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

- DrYang\_22, Hirko\_18, Vibaki\_19,

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

Start 1:

- Found in 20 of 23 ( 87.0% ) of genes in pham
- Manual Annotations of this start: 12 of 20

- Called 60.0% of time when present
- Phage (with cluster) where this start called: Chipper1996\_220 (AR), Chocolat\_22 (AR), Chubster\_22 (AR), Colucci\_21 (AR), Conboy\_22 (AR), EdgarPoe\_22 (AR), HumptyDumpty\_22 (AR), KBurrousTX\_22 (AR), Kabreeze\_22 (AR), PrincessTrina\_22 (AR), RosiePosie\_22 (AR), Scavito\_22 (AR),

#### Start 2:

- Found in 21 of 23 ( 91.3% ) of genes in pham
- Manual Annotations of this start: 6 of 20
- Called 42.9% of time when present
- Phage (with cluster) where this start called: ArV1\_018 (AR), DrYang\_22 (AR), JaNo\_22 (AR), JayCookie\_22 (AR), Linus\_22 (AR), Lymara\_22 (AR), Mordred\_22 (AR), MoyaNatalis\_22 (AR), Tophat\_22 (AR),

#### Start 12:

- Found in 21 of 23 ( 91.3% ) of genes in pham
- Manual Annotations of this start: 1 of 20
- Called 4.8% of time when present
- Phage (with cluster) where this start called: Hirko\_18 (FL),

#### Start 17:

- Found in 20 of 23 ( 87.0% ) of genes in pham
- Manual Annotations of this start: 1 of 20
- Called 5.0% of time when present
- Phage (with cluster) where this start called: Vibaki\_19 (FL),

### Summary by clusters:

There are 2 clusters represented in this pham: AR, FL,

Info for manual annotations of cluster AR:

- Start number 1 was manually annotated 12 times for cluster AR.
- Start number 2 was manually annotated 6 times for cluster AR.

Info for manual annotations of cluster FL:

- Start number 12 was manually annotated 1 time for cluster FL.
- Start number 17 was manually annotated 1 time for cluster FL.

### Gene Information:

Gene: ArV1\_018 Start: 14054, Stop: 17587, Start Num: 2

Candidate Starts for ArV1\_018:

(Start: 1 @14048 has 12 MA's), (Start: 2 @14054 has 6 MA's), (5, 14126), (6, 14138), (7, 14159), (9, 14204), (Start: 12 @14237 has 1 MA's), (13, 14255), (14, 14279), (15, 14288), (16, 14309), (20, 14357), (23, 14468), (31, 14552), (37, 14669), (40, 14744), (46, 14837), (49, 14873), (50, 14924), (51, 14930), (54, 14945), (55, 14975), (56, 15020), (57, 15032), (58, 15077), (59, 15086), (61, 15107), (63, 15146), (65, 15185), (67, 15251), (71, 15317), (74, 15377), (77, 15419), (80, 15428), (82, 15458), (86, 15479), (87, 15485), (88, 15491), (93, 15557), (99, 15650), (100, 15653), (101, 15674), (103, 15692), (104, 15695), (107, 15716), (108, 15725), (110, 15737), (111, 15740), (113, 15761), (114, 15770), (115, 15773), (119, 15812), (120, 15827), (125, 15875), (126, 15890), (132, 15941), (133, 15947), (138, 15971), (141, 15980), (142, 15986), (145, 16022), (156, 16121), (161, 16190), (164, 16208),

(167, 16241), (177, 16253), (183, 16325), (184, 16352), (187, 16373), (189, 16442), (190, 16448), (191, 16463), (194, 16484), (195, 16505), (201, 16562), (208, 16595), (209, 16598), (212, 16622), (216, 16691), (219, 16727), (220, 16730), (221, 16733), (225, 16775), (227, 16796), (232, 16835), (237, 16898), (238, 16955), (244, 17096), (245, 17108), (249, 17177), (252, 17219), (254, 17249), (255, 17288), (256, 17309), (259, 17354), (261, 17417), (262, 17426), (267, 17489), (271, 17546),

Gene: Chipper1996\_220 Start: 15723, Stop: 19265, Start Num: 1

Candidate Starts for Chipper1996\_220:

(Start: 1 @15723 has 12 MA's), (Start: 2 @15729 has 6 MA's), (3, 15750), (4, 15753), (7, 15834), (9, 15879), (Start: 12 @15912 has 1 MA's), (13, 15930), (15, 15963), (Start: 17 @15993 has 1 MA's), (19, 16020), (20, 16032), (24, 16149), (26, 16173), (30, 16224), (31, 16227), (36, 16332), (37, 16344), (40, 16419), (42, 16449), (43, 16470), (46, 16512), (54, 16620), (55, 16650), (56, 16695), (57, 16707), (58, 16752), (59, 16761), (63, 16821), (65, 16860), (73, 17040), (74, 17052), (75, 17061), (77, 17094), (79, 17100), (80, 17103), (86, 17154), (87, 17160), (88, 17166), (91, 17190), (92, 17217), (93, 17232), (94, 17244), (99, 17325), (100, 17328), (101, 17349), (103, 17367), (104, 17370), (107, 17391), (111, 17415), (113, 17436), (114, 17445), (115, 17448), (119, 17487), (121, 17511), (125, 17550), (126, 17565), (133, 17622), (138, 17646), (141, 17655), (142, 17661), (145, 17697), (152, 17745), (153, 17754), (156, 17796), (157, 17808), (161, 17865), (164, 17883), (165, 17898), (166, 17904), (183, 18000), (184, 18027), (187, 18048), (189, 18117), (191, 18138), (194, 18159), (201, 18237), (208, 18270), (209, 18273), (212, 18297), (216, 18366), (219, 18402), (220, 18405), (221, 18408), (222, 18423), (227, 18471), (231, 18507), (232, 18510), (237, 18573), (241, 18705), (244, 18771), (247, 18813), (249, 18852), (252, 18897), (255, 18966), (256, 18987), (259, 19032), (261, 19095), (264, 19134), (265, 19149), (269, 19200), (270, 19212),

Gene: Chocolat\_22 Start: 15724, Stop: 19266, Start Num: 1

Candidate Starts for Chocolat\_22:

(Start: 1 @15724 has 12 MA's), (Start: 2 @15730 has 6 MA's), (3, 15751), (4, 15754), (7, 15835), (9, 15880), (Start: 12 @15913 has 1 MA's), (13, 15931), (15, 15964), (Start: 17 @15994 has 1 MA's), (19, 16021), (20, 16033), (24, 16150), (26, 16174), (30, 16225), (31, 16228), (36, 16333), (37, 16345), (40, 16420), (42, 16450), (43, 16471), (46, 16513), (54, 16621), (55, 16651), (56, 16696), (57, 16708), (58, 16753), (59, 16762), (63, 16822), (65, 16861), (73, 17041), (74, 17053), (75, 17062), (77, 17095), (79, 17101), (80, 17104), (86, 17155), (87, 17161), (88, 17167), (91, 17191), (92, 17218), (93, 17233), (94, 17245), (99, 17326), (100, 17329), (101, 17350), (103, 17368), (104, 17371), (107, 17392), (111, 17416), (113, 17437), (114, 17446), (115, 17449), (119, 17488), (121, 17512), (125, 17551), (126, 17566), (133, 17623), (138, 17647), (141, 17656), (142, 17662), (145, 17698), (152, 17746), (153, 17755), (156, 17797), (157, 17809), (161, 17866), (164, 17884), (165, 17899), (166, 17905), (183, 18001), (184, 18028), (187, 18049), (189, 18118), (191, 18139), (194, 18160), (201, 18238), (208, 18271), (209, 18274), (212, 18298), (216, 18367), (219, 18403), (220, 18406), (221, 18409), (222, 18424), (227, 18472), (231, 18508), (232, 18511), (237, 18574), (241, 18706), (244, 18772), (247, 18814), (249, 18853), (252, 18898), (255, 18967), (256, 18988), (259, 19033), (261, 19096), (264, 19135), (265, 19150), (269, 19201), (270, 19213),

Gene: Chubster\_22 Start: 15494, Stop: 19036, Start Num: 1

Candidate Starts for Chubster\_22:

(Start: 1 @15494 has 12 MA's), (Start: 2 @15500 has 6 MA's), (3, 15521), (4, 15524), (7, 15605), (9, 15650), (Start: 12 @15683 has 1 MA's), (13, 15701), (15, 15734), (Start: 17 @15764 has 1 MA's), (19, 15791), (20, 15803), (24, 15920), (26, 15944), (30, 15995), (31, 15998), (36, 16103), (37, 16115), (40, 16190), (42, 16220), (43, 16241), (46, 16283), (54, 16391), (55, 16421), (56, 16466), (57, 16478), (58, 16523), (59, 16532), (63, 16592), (65, 16631), (73, 16811), (74, 16823), (75, 16832), (77, 16865), (79, 16871), (80, 16874), (86, 16925), (87, 16931), (88, 16937), (91, 16961), (92, 16988), (93, 17003), (94, 17015), (99, 17096), (100, 17099), (101, 17120), (103, 17138), (104, 17141), (107, 17162), (111, 17186), (113, 17207), (114, 17216), (115, 17219), (119, 17258), (121, 17282), (125, 17321), (126, 17336), (133, 17393), (138, 17417), (141, 17426), (142, 17432), (145, 17468), (152, 17516), (153,

17525), (156, 17567), (157, 17579), (161, 17636), (164, 17654), (165, 17669), (166, 17675), (183, 17771), (184, 17798), (187, 17819), (189, 17888), (191, 17909), (194, 17930), (201, 18008), (208, 18041), (209, 18044), (212, 18068), (216, 18137), (219, 18173), (220, 18176), (221, 18179), (222, 18194), (227, 18242), (231, 18278), (232, 18281), (237, 18344), (241, 18476), (244, 18542), (247, 18584), (249, 18623), (252, 18668), (255, 18737), (256, 18758), (259, 18803), (261, 18866), (264, 18905), (265, 18920), (269, 18971), (270, 18983),

Gene: Colucci\_21 Start: 15200, Stop: 18736, Start Num: 1

Candidate Starts for Colucci\_21:

(Start: 1 @15200 has 12 MA's), (Start: 2 @15206 has 6 MA's), (5, 15278), (6, 15290), (7, 15311), (9, 15356), (11, 15386), (13, 15407), (15, 15440), (20, 15509), (23, 15620), (26, 15650), (27, 15662), (28, 15683), (31, 15704), (36, 15809), (37, 15821), (40, 15896), (42, 15926), (43, 15947), (46, 15989), (49, 16025), (50, 16076), (51, 16082), (54, 16097), (56, 16172), (57, 16184), (58, 16229), (59, 16238), (61, 16259), (65, 16337), (67, 16403), (68, 16406), (70, 16463), (71, 16469), (74, 16529), (77, 16571), (80, 16580), (86, 16631), (87, 16637), (88, 16643), (90, 16658), (92, 16694), (93, 16709), (101, 16826), (103, 16844), (104, 16847), (106, 16865), (107, 16868), (108, 16877), (111, 16892), (112, 16898), (113, 16913), (114, 16922), (115, 16925), (119, 16964), (121, 16988), (124, 17009), (125, 17027), (126, 17042), (133, 17099), (139, 17126), (141, 17132), (142, 17138), (149, 17213), (155, 17252), (157, 17285), (161, 17342), (164, 17360), (165, 17375), (166, 17381), (183, 17477), (184, 17504), (189, 17594), (191, 17615), (192, 17630), (194, 17636), (201, 17714), (202, 17717), (207, 17744), (208, 17747), (209, 17750), (210, 17765), (219, 17879), (222, 17900), (225, 17927), (227, 17948), (229, 17969), (230, 17975), (233, 17996), (237, 18050), (244, 18248), (245, 18260), (249, 18329), (251, 18353), (252, 18371), (255, 18437), (256, 18458), (259, 18503), (263, 18599), (264, 18605), (272, 18716),

Gene: Conboy\_22 Start: 15722, Stop: 19264, Start Num: 1

Candidate Starts for Conboy\_22:

(Start: 1 @15722 has 12 MA's), (Start: 2 @15728 has 6 MA's), (3, 15749), (4, 15752), (7, 15833), (9, 15878), (Start: 12 @15911 has 1 MA's), (13, 15929), (15, 15962), (Start: 17 @15992 has 1 MA's), (19, 16019), (20, 16031), (24, 16148), (26, 16172), (30, 16223), (31, 16226), (36, 16331), (37, 16343), (40, 16418), (42, 16448), (43, 16469), (46, 16511), (54, 16619), (55, 16649), (56, 16694), (57, 16706), (58, 16751), (59, 16760), (63, 16820), (65, 16859), (73, 17039), (74, 17051), (75, 17060), (77, 17093), (79, 17099), (80, 17102), (86, 17153), (87, 17159), (88, 17165), (91, 17189), (92, 17216), (93, 17231), (94, 17243), (99, 17324), (100, 17327), (101, 17348), (103, 17366), (104, 17369), (107, 17390), (111, 17414), (113, 17435), (114, 17444), (115, 17447), (119, 17486), (121, 17510), (125, 17549), (126, 17564), (133, 17621), (138, 17645), (141, 17654), (142, 17660), (145, 17696), (152, 17744), (153, 17753), (156, 17795), (157, 17807), (161, 17864), (164, 17882), (165, 17897), (166, 17903), (183, 17999), (184, 18026), (187, 18047), (189, 18116), (191, 18137), (194, 18158), (201, 18236), (208, 18269), (209, 18272), (212, 18296), (216, 18365), (219, 18401), (220, 18404), (221, 18407), (222, 18422), (227, 18470), (231, 18506), (232, 18509), (237, 18572), (241, 18704), (244, 18770), (247, 18812), (249, 18851), (252, 18896), (255, 18965), (256, 18986), (259, 19031), (261, 19094), (264, 19133), (265, 19148), (269, 19199), (270, 19211),

Gene: DrYang\_22 Start: 15693, Stop: 19463, Start Num: 2

Candidate Starts for DrYang\_22:

(Start: 2 @15693 has 6 MA's), (5, 15765), (9, 15843), (10, 15852), (Start: 12 @15876 has 1 MA's), (13, 15894), (15, 15927), (Start: 17 @15957 has 1 MA's), (19, 15984), (20, 15996), (22, 16095), (26, 16137), (30, 16188), (31, 16191), (36, 16296), (37, 16308), (38, 16350), (40, 16383), (42, 16413), (46, 16476), (49, 16512), (51, 16569), (56, 16659), (57, 16671), (58, 16716), (59, 16725), (61, 16746), (63, 16785), (65, 16824), (69, 16899), (72, 16977), (74, 17016), (78, 17061), (80, 17067), (81, 17079), (82, 17097), (83, 17103), (85, 17109), (88, 17130), (90, 17145), (92, 17181), (94, 17208), (95, 17214), (96, 17217), (99, 17289), (102, 17322), (104, 17334), (105, 17340), (106, 17352), (113, 17400), (114, 17409), (116, 17421), (117, 17424), (118, 17427), (119, 17451), (122, 17478), (126, 17529), (127,

17532), (129, 17550), (133, 17586), (137, 17607), (141, 17619), (142, 17625), (145, 17661), (147, 17679), (148, 17694), (150, 17703), (152, 17709), (155, 17739), (156, 17760), (157, 17772), (158, 17781), (160, 17805), (161, 17829), (166, 17868), (169, 17904), (170, 17907), (173, 17937), (174, 17940), (176, 17964), (179, 18003), (183, 18066), (184, 18093), (189, 18183), (191, 18204), (195, 18246), (200, 18333), (202, 18339), (203, 18360), (205, 18441), (206, 18453), (207, 18468), (214, 18537), (218, 18588), (219, 18603), (221, 18609), (224, 18633), (225, 18651), (227, 18672), (231, 18708), (234, 18723), (237, 18774), (241, 18906), (244, 18972), (249, 19053), (255, 19164), (256, 19185), (259, 19230), (261, 19293), (262, 19302), (264, 19332), (268, 19386), (271, 19422),

Gene: EdgarPoe\_22 Start: 15722, Stop: 19264, Start Num: 1

Candidate Starts for EdgarPoe\_22:

(Start: 1 @15722 has 12 MA's), (Start: 2 @15728 has 6 MA's), (3, 15749), (4, 15752), (7, 15833), (9, 15878), (Start: 12 @15911 has 1 MA's), (13, 15929), (15, 15962), (Start: 17 @15992 has 1 MA's), (19, 16019), (20, 16031), (24, 16148), (26, 16172), (30, 16223), (31, 16226), (36, 16331), (37, 16343), (40, 16418), (42, 16448), (43, 16469), (46, 16511), (54, 16619), (55, 16649), (56, 16694), (57, 16706), (58, 16751), (59, 16760), (63, 16820), (65, 16859), (73, 17039), (74, 17051), (75, 17060), (77, 17093), (79, 17099), (80, 17102), (86, 17153), (87, 17159), (88, 17165), (91, 17189), (92, 17216), (93, 17231), (94, 17243), (99, 17324), (100, 17327), (101, 17348), (103, 17366), (104, 17369), (107, 17390), (111, 17414), (113, 17435), (114, 17444), (115, 17447), (119, 17486), (121, 17510), (125, 17549), (126, 17564), (133, 17621), (138, 17645), (141, 17654), (142, 17660), (145, 17696), (152, 17744), (153, 17753), (156, 17795), (157, 17807), (161, 17864), (164, 17882), (165, 17897), (166, 17903), (183, 17999), (184, 18026), (187, 18047), (189, 18116), (191, 18137), (194, 18158), (201, 18236), (208, 18269), (209, 18272), (212, 18296), (216, 18365), (219, 18401), (220, 18404), (221, 18407), (222, 18422), (227, 18470), (231, 18506), (232, 18509), (237, 18572), (241, 18704), (244, 18770), (247, 18812), (249, 18851), (252, 18896), (255, 18965), (256, 18986), (259, 19031), (261, 19094), (264, 19133), (265, 19148), (269, 19199), (270, 19211),

Gene: Hirko\_18 Start: 14681, Stop: 17965, Start Num: 12

Candidate Starts for Hirko\_18:

(Start: 12 @14681 has 1 MA's), (Start: 17 @14750 has 1 MA's), (21, 14795), (25, 14921), (31, 14978), (33, 15050), (39, 15164), (41, 15200), (45, 15266), (53, 15371), (60, 15518), (62, 15536), (64, 15584), (66, 15626), (74, 15773), (76, 15791), (84, 15848), (97, 15962), (98, 16010), (108, 16091), (118, 16154), (123, 16214), (128, 16271), (131, 16304), (136, 16328), (138, 16343), (140, 16349), (144, 16376), (151, 16445), (179, 16640), (181, 16655), (182, 16682), (183, 16703), (186, 16742), (193, 16859), (196, 16898), (197, 16907), (213, 17033), (215, 17042), (223, 17129), (226, 17168), (228, 17177), (230, 17201), (235, 17240), (239, 17375), (240, 17378), (246, 17507), (249, 17555), (253, 17627), (259, 17735), (260, 17789), (265, 17852), (266, 17864), (270, 17912),

Gene: HumptyDumpty\_22 Start: 15721, Stop: 19263, Start Num: 1

Candidate Starts for HumptyDumpty\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247,

18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: JaNo\_22 Start: 15727, Stop: 19263, Start Num: 2

Candidate Starts for JaNo\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247, 18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: JayCookie\_22 Start: 15730, Stop: 19266, Start Num: 2

Candidate Starts for JayCookie\_22:

(Start: 1 @15724 has 12 MA's), (Start: 2 @15730 has 6 MA's), (3, 15751), (4, 15754), (7, 15835), (9, 15880), (Start: 12 @15913 has 1 MA's), (13, 15931), (15, 15964), (Start: 17 @15994 has 1 MA's), (19, 16021), (20, 16033), (24, 16150), (26, 16174), (30, 16225), (31, 16228), (36, 16333), (37, 16345), (40, 16420), (42, 16450), (43, 16471), (46, 16513), (54, 16621), (55, 16651), (56, 16696), (57, 16708), (58, 16753), (59, 16762), (63, 16822), (65, 16861), (73, 17041), (74, 17053), (75, 17062), (77, 17095), (79, 17101), (80, 17104), (86, 17155), (87, 17161), (88, 17167), (91, 17191), (92, 17218), (93, 17233), (94, 17245), (99, 17326), (100, 17329), (101, 17350), (103, 17368), (104, 17371), (107, 17392), (111, 17416), (113, 17437), (114, 17446), (115, 17449), (119, 17488), (121, 17512), (125, 17551), (126, 17566), (133, 17623), (138, 17647), (141, 17656), (142, 17662), (145, 17698), (152, 17746), (153, 17755), (156, 17797), (157, 17809), (161, 17866), (164, 17884), (165, 17899), (166, 17905), (183, 18001), (184, 18028), (187, 18049), (189, 18118), (191, 18139), (194, 18160), (201, 18238), (208, 18271), (209, 18274), (212, 18298), (216, 18367), (219, 18403), (220, 18406), (221, 18409), (222, 18424), (227, 18472), (231, 18508), (232, 18511), (237, 18574), (241, 18706), (244, 18772), (247, 18814), (249, 18853), (252, 18898), (255, 18967), (256, 18988), (259, 19033), (261, 19096), (264, 19135), (265, 19150), (269, 19201), (270, 19213),

Gene: KBurrousTX\_22 Start: 15522, Stop: 19298, Start Num: 1

Candidate Starts for KBurrousTX\_22:

(Start: 1 @15522 has 12 MA's), (Start: 2 @15528 has 6 MA's), (3, 15549), (5, 15600), (8, 15666), (9, 15678), (10, 15687), (Start: 12 @15711 has 1 MA's), (13, 15729), (15, 15762), (20, 15831), (22, 15930), (23, 15942), (24, 15948), (29, 16011), (31, 16026), (32, 16038), (36, 16131), (37, 16143), (38, 16185), (40, 16218), (42, 16248), (43, 16269), (46, 16311), (47, 16332), (49, 16347), (52, 16407), (56, 16494), (57, 16506), (58, 16551), (59, 16560), (61, 16581), (63, 16620), (70, 16785), (72, 16812), (74, 16851), (78, 16896), (80, 16902), (81, 16914), (89, 16977), (92, 17016), (96, 17052), (99, 17124), (100, 17127), (101, 17148), (103, 17166), (113, 17235), (116, 17256), (118, 17262), (119, 17286), (121, 17310), (132, 17415), (133, 17421), (143, 17463), (146, 17508), (152, 17550), (153, 17559), (155, 17580), (157, 17613), (159, 17643), (161, 17670), (163, 17679), (167, 17721), (168, 17733), (170, 17745), (171, 17751), (172, 17757), (175, 17796), (176, 17802), (178, 17820), (179, 17841), (180, 17853), (183, 17904), (189, 18021), (191, 18042), (195, 18084), (198, 18129), (200, 18171), (201, 18174), (202, 18177), (204, 18219), (206, 18291), (207, 18306), (209, 18312), (217, 18414),

(220, 18444), (221, 18447), (227, 18510), (231, 18546), (232, 18549), (236, 18606), (238, 18669), (241, 18744), (242, 18789), (249, 18891), (252, 18933), (255, 19002), (256, 19023), (259, 19068), (262, 19140), (267, 19200), (270, 19245),

Gene: Kabreeze\_22 Start: 15721, Stop: 19263, Start Num: 1

Candidate Starts for Kabreeze\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247, 18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: Linus\_22 Start: 15727, Stop: 19263, Start Num: 2

Candidate Starts for Linus\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247, 18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: Lymara\_22 Start: 15725, Stop: 19261, Start Num: 2

Candidate Starts for Lymara\_22:

(Start: 1 @15719 has 12 MA's), (Start: 2 @15725 has 6 MA's), (3, 15746), (4, 15749), (7, 15830), (9, 15875), (Start: 12 @15908 has 1 MA's), (13, 15926), (14, 15950), (15, 15959), (Start: 17 @15989 has 1 MA's), (19, 16016), (20, 16028), (22, 16127), (24, 16145), (26, 16169), (30, 16220), (31, 16223), (36, 16328), (37, 16340), (40, 16415), (42, 16445), (43, 16466), (46, 16508), (49, 16544), (51, 16601), (54, 16616), (55, 16646), (56, 16691), (57, 16703), (58, 16748), (63, 16817), (65, 16856), (67, 16922), (71, 16988), (74, 17048), (75, 17057), (77, 17090), (80, 17099), (86, 17150), (88, 17162), (92, 17213), (93, 17228), (94, 17240), (99, 17321), (101, 17345), (103, 17363), (104, 17366), (106, 17384), (107, 17387), (108, 17396), (109, 17405), (111, 17411), (112, 17417), (113, 17432), (114, 17441), (115, 17444), (119, 17483), (125, 17546), (126, 17561), (133, 17618), (135, 17624), (141, 17651), (142, 17657), (145, 17693), (152, 17741), (155, 17771), (156, 17792), (161, 17861), (164, 17879), (165, 17894), (180, 17945), (183, 17996), (184, 18023), (189, 18113), (190, 18119), (191, 18134), (195,



18176), (201, 18233), (208, 18266), (209, 18269), (212, 18293), (219, 18398), (220, 18401), (221, 18404), (227, 18467), (231, 18503), (237, 18569), (244, 18767), (245, 18779), (248, 18845), (249, 18848), (250, 18854), (252, 18893), (254, 18923), (255, 18962), (256, 18983), (259, 19028), (261, 19091), (265, 19145), (269, 19196), (270, 19208),

Gene: Mordred\_22 Start: 15727, Stop: 19263, Start Num: 2

Candidate Starts for Mordred\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247, 18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: MoyaNatalis\_22 Start: 15730, Stop: 19266, Start Num: 2

Candidate Starts for MoyaNatalis\_22:

(Start: 1 @15724 has 12 MA's), (Start: 2 @15730 has 6 MA's), (3, 15751), (4, 15754), (7, 15835), (9, 15880), (Start: 12 @15913 has 1 MA's), (13, 15931), (15, 15964), (Start: 17 @15994 has 1 MA's), (19, 16021), (20, 16033), (24, 16150), (26, 16174), (30, 16225), (31, 16228), (36, 16333), (37, 16345), (40, 16420), (42, 16450), (43, 16471), (46, 16513), (54, 16621), (55, 16651), (56, 16696), (57, 16708), (58, 16753), (59, 16762), (63, 16822), (65, 16861), (73, 17041), (74, 17053), (75, 17062), (77, 17095), (79, 17101), (80, 17104), (86, 17155), (87, 17161), (88, 17167), (91, 17191), (92, 17218), (93, 17233), (94, 17245), (99, 17326), (100, 17329), (101, 17350), (103, 17368), (104, 17371), (107, 17392), (111, 17416), (113, 17437), (114, 17446), (115, 17449), (119, 17488), (121, 17512), (125, 17551), (126, 17566), (133, 17623), (138, 17647), (141, 17656), (142, 17662), (145, 17698), (152, 17746), (153, 17755), (156, 17797), (157, 17809), (161, 17866), (164, 17884), (165, 17899), (166, 17905), (183, 18001), (184, 18028), (187, 18049), (189, 18118), (191, 18139), (194, 18160), (201, 18238), (208, 18271), (209, 18274), (212, 18298), (216, 18367), (219, 18403), (220, 18406), (221, 18409), (222, 18424), (227, 18472), (231, 18508), (232, 18511), (237, 18574), (241, 18706), (244, 18772), (245, 18784), (249, 18853), (252, 18898), (255, 18967), (256, 18988), (259, 19033), (261, 19096), (264, 19135), (265, 19150), (269, 19201), (270, 19213),

Gene: PrincessTrina\_22 Start: 15724, Stop: 19266, Start Num: 1

Candidate Starts for PrincessTrina\_22:

(Start: 1 @15724 has 12 MA's), (Start: 2 @15730 has 6 MA's), (3, 15751), (4, 15754), (7, 15835), (9, 15880), (Start: 12 @15913 has 1 MA's), (13, 15931), (15, 15964), (Start: 17 @15994 has 1 MA's), (19, 16021), (20, 16033), (24, 16150), (26, 16174), (30, 16225), (31, 16228), (36, 16333), (37, 16345), (40, 16420), (42, 16450), (43, 16471), (46, 16513), (54, 16621), (55, 16651), (56, 16696), (57, 16708), (58, 16753), (59, 16762), (63, 16822), (65, 16861), (73, 17041), (74, 17053), (75, 17062), (77, 17095), (79, 17101), (80, 17104), (86, 17155), (87, 17161), (88, 17167), (91, 17191), (92, 17218), (93, 17233), (94, 17245), (99, 17326), (100, 17329), (101, 17350), (103, 17368), (104, 17371), (107, 17392), (111, 17416), (113, 17437), (114, 17446), (115, 17449), (119, 17488), (121, 17512), (125, 17551), (126, 17566), (133, 17623), (138, 17647), (141, 17656), (142, 17662), (145, 17698), (152, 17746), (153, 17755), (156, 17797), (157, 17809), (161, 17866), (164, 17884), (165, 17899), (166, 17905), (183,

18001), (184, 18028), (187, 18049), (189, 18118), (191, 18139), (194, 18160), (201, 18238), (208, 18271), (209, 18274), (212, 18298), (216, 18367), (219, 18403), (220, 18406), (221, 18409), (222, 18424), (227, 18472), (231, 18508), (232, 18511), (237, 18574), (241, 18706), (244, 18772), (247, 18814), (249, 18853), (252, 18898), (255, 18967), (256, 18988), (259, 19033), (261, 19096), (264, 19135), (265, 19150), (269, 19201), (270, 19213),

Gene: RosiePosie\_22 Start: 15724, Stop: 19266, Start Num: 1

Candidate Starts for RosiePosie\_22:

(Start: 1 @15724 has 12 MA's), (Start: 2 @15730 has 6 MA's), (3, 15751), (4, 15754), (7, 15835), (9, 15880), (Start: 12 @15913 has 1 MA's), (13, 15931), (15, 15964), (Start: 17 @15994 has 1 MA's), (19, 16021), (20, 16033), (24, 16150), (26, 16174), (30, 16225), (31, 16228), (36, 16333), (37, 16345), (40, 16420), (42, 16450), (43, 16471), (46, 16513), (54, 16621), (55, 16651), (56, 16696), (57, 16708), (58, 16753), (59, 16762), (63, 16822), (65, 16861), (73, 17041), (74, 17053), (75, 17062), (77, 17095), (79, 17101), (80, 17104), (86, 17155), (87, 17161), (88, 17167), (91, 17191), (92, 17218), (93, 17233), (94, 17245), (99, 17326), (100, 17329), (101, 17350), (103, 17368), (104, 17371), (107, 17392), (111, 17416), (113, 17437), (114, 17446), (115, 17449), (119, 17488), (121, 17512), (125, 17551), (126, 17566), (133, 17623), (138, 17647), (141, 17656), (142, 17662), (145, 17698), (152, 17746), (153, 17755), (156, 17797), (157, 17809), (161, 17866), (164, 17884), (165, 17899), (166, 17905), (183, 18001), (184, 18028), (187, 18049), (189, 18118), (191, 18139), (194, 18160), (201, 18238), (208, 18271), (209, 18274), (212, 18298), (216, 18367), (219, 18403), (220, 18406), (221, 18409), (222, 18424), (227, 18472), (231, 18508), (232, 18511), (237, 18574), (241, 18706), (244, 18772), (247, 18814), (249, 18853), (252, 18898), (255, 18967), (256, 18988), (259, 19033), (261, 19096), (264, 19135), (265, 19150), (269, 19201), (270, 19213),

Gene: Scavito\_22 Start: 15721, Stop: 19263, Start Num: 1

Candidate Starts for Scavito\_22:

(Start: 1 @15721 has 12 MA's), (Start: 2 @15727 has 6 MA's), (3, 15748), (4, 15751), (7, 15832), (9, 15877), (Start: 12 @15910 has 1 MA's), (13, 15928), (15, 15961), (Start: 17 @15991 has 1 MA's), (19, 16018), (20, 16030), (24, 16147), (26, 16171), (30, 16222), (31, 16225), (36, 16330), (37, 16342), (40, 16417), (42, 16447), (43, 16468), (46, 16510), (54, 16618), (55, 16648), (56, 16693), (57, 16705), (58, 16750), (59, 16759), (63, 16819), (65, 16858), (73, 17038), (74, 17050), (75, 17059), (77, 17092), (79, 17098), (80, 17101), (86, 17152), (87, 17158), (88, 17164), (91, 17188), (92, 17215), (93, 17230), (94, 17242), (99, 17323), (100, 17326), (101, 17347), (103, 17365), (104, 17368), (107, 17389), (111, 17413), (113, 17434), (114, 17443), (115, 17446), (119, 17485), (121, 17509), (125, 17548), (126, 17563), (133, 17620), (138, 17644), (141, 17653), (142, 17659), (145, 17695), (152, 17743), (153, 17752), (156, 17794), (157, 17806), (161, 17863), (164, 17881), (165, 17896), (166, 17902), (183, 17998), (184, 18025), (187, 18046), (189, 18115), (191, 18136), (194, 18157), (201, 18235), (208, 18268), (209, 18271), (212, 18295), (216, 18364), (219, 18400), (220, 18403), (221, 18406), (222, 18421), (227, 18469), (231, 18505), (232, 18508), (237, 18571), (241, 18703), (244, 18769), (247, 18811), (249, 18850), (252, 18895), (255, 18964), (256, 18985), (259, 19030), (261, 19093), (264, 19132), (265, 19147), (269, 19198), (270, 19210),

Gene: Tophat\_22 Start: 15729, Stop: 19265, Start Num: 2

Candidate Starts for Tophat\_22:

(Start: 1 @15723 has 12 MA's), (Start: 2 @15729 has 6 MA's), (3, 15750), (4, 15753), (7, 15834), (9, 15879), (Start: 12 @15912 has 1 MA's), (13, 15930), (15, 15963), (Start: 17 @15993 has 1 MA's), (19, 16020), (20, 16032), (24, 16149), (26, 16173), (30, 16224), (31, 16227), (36, 16332), (37, 16344), (40, 16419), (42, 16449), (43, 16470), (46, 16512), (54, 16620), (55, 16650), (56, 16695), (57, 16707), (58, 16752), (59, 16761), (63, 16821), (65, 16860), (73, 17040), (74, 17052), (75, 17061), (77, 17094), (79, 17100), (80, 17103), (86, 17154), (87, 17160), (88, 17166), (91, 17190), (92, 17217), (93, 17232), (94, 17244), (99, 17325), (100, 17328), (101, 17349), (103, 17367), (104, 17370), (107, 17391), (111, 17415), (113, 17436), (114, 17445), (115, 17448), (119, 17487), (121, 17511), (125, 17550), (126, 17565), (133, 17622), (138, 17646), (141, 17655), (142, 17661), (145, 17697), (152, 17745), (153,

17754), (156, 17796), (157, 17808), (161, 17865), (164, 17883), (165, 17898), (166, 17904), (183, 18000), (184, 18027), (187, 18048), (189, 18117), (191, 18138), (194, 18159), (201, 18237), (208, 18270), (209, 18273), (212, 18297), (216, 18366), (219, 18402), (220, 18405), (221, 18408), (222, 18423), (227, 18471), (231, 18507), (232, 18510), (237, 18573), (241, 18705), (244, 18771), (247, 18813), (249, 18852), (252, 18897), (255, 18966), (256, 18987), (259, 19032), (261, 19095), (264, 19134), (265, 19149), (269, 19200), (270, 19212),

Gene: Vibaki\_19 Start: 15202, Stop: 18351, Start Num: 17

Candidate Starts for Vibaki\_19:

(Start: 17 @15202 has 1 MA's), (18, 15223), (21, 15247), (31, 15397), (34, 15451), (35, 15475), (41, 15586), (44, 15643), (45, 15652), (48, 15685), (53, 15757), (60, 15904), (62, 15922), (64, 15970), (66, 16012), (74, 16159), (106, 16465), (118, 16540), (119, 16564), (130, 16675), (134, 16708), (136, 16714), (140, 16735), (146, 16792), (154, 16846), (157, 16897), (162, 16960), (165, 16987), (183, 17089), (185, 17119), (188, 17158), (193, 17245), (196, 17284), (199, 17317), (211, 17380), (213, 17419), (217, 17464), (221, 17497), (223, 17515), (226, 17554), (230, 17587), (233, 17608), (235, 17626), (239, 17761), (240, 17764), (243, 17848), (245, 17872), (249, 17941), (253, 18013), (257, 18082), (258, 18091), (259, 18121), (260, 18175), (265, 18238), (266, 18250), (270, 18298),