



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 311749 Report

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

Pham number 311749 has 45 members, 9 are drafts.

Phages represented in each track:

- Track 1 : AbbyDaisy\_17
- Track 2 : Raqqa\_17
- Track 3 : lchiang\_18
- Track 4 : Zaheer\_20
- Track 5 : Dirdigger\_20
- Track 6 : Schism\_20
- Track 7 : MillySue\_20
- Track 8 : IsHungry\_20
- Track 9 : Julie\_20
- Track 10 : Halloweekend\_18
- Track 11 : Popper\_18
- Track 12 : Nandita\_20, Guinevere\_20
- Track 13 : Gusanita\_18
- Track 14 : Yonex\_20, Ryan\_20
- Track 15 : Lenoxika\_20
- Track 16 : Toodles\_20
- Track 17 : Elesar\_19
- Track 18 : QuinnAvery\_20
- Track 19 : Cole\_18
- Track 20 : Saintcarr\_19
- Track 21 : Kihatsu\_21
- Track 22 : AllBusiness\_19
- Track 23 : BigSherm\_20
- Track 24 : Donatella\_19
- Track 25 : ToastyOats\_22
- Track 26 : GoodLuckBabe\_20
- Track 27 : Cassini\_17
- Track 28 : Bauer\_19
- Track 29 : BellaJr\_19
- Track 30 : BlackSpider\_17
- Track 31 : Zucker\_18
- Track 32 : Merpity\_18
- Track 33 : Skitty\_16
- Track 34 : MrSmee\_16
- Track 35 : PauloDiaboli\_97, Dodo\_99
- Track 36 : A3Wally\_97
- Track 37 : Zooman\_82

- Track 38 : Erasmago\_88
- Track 39 : Big4\_86
- Track 40 : Cece\_80
- Track 41 : Pumpernickel\_94
- Track 42 : Magritte\_36

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

The start number called the most often in the published annotations is 3, it was called in 24 of the 36 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- AbbyDaisy\_17, AllBusiness\_19, BellaJr\_19, BigSherm\_20, BlackSpider\_17, Cassini\_17, Cole\_18, Dirdigger\_20, Donatella\_19, Elesar\_19, GoodLuckBabe\_20, Guinevere\_20, Gusanita\_18, Halloweekend\_18, Ichiang\_18, IsHungry\_20, Julie\_20, Kihatsu\_21, Lenoxika\_20, MillySue\_20, Nandita\_20, Popper\_18, QuinnAvery\_20, Raqqa\_17, Ryan\_20, Saintcarr\_19, Schism\_20, ToastyOats\_22, Toodles\_20, Yonex\_20, Zaheer\_20,

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

- 

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

- A3Wally\_97, Bauer\_19, Big4\_86, Cece\_80, Dodo\_99, Erasmago\_88, Magritte\_36, Merpity\_18, MrSmee\_16, PauloDiaboli\_97, Pumpernickel\_94, Skitty\_16, Zooman\_82, Zucker\_18,

**Summary by start number:**

Start 3:

- Found in 31 of 45 ( 68.9% ) of genes in pham
- Manual Annotations of this start: 24 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AbbyDaisy\_17 (AY), AllBusiness\_19 (FF), BellaJr\_19 (FN), BigSherm\_20 (FF), BlackSpider\_17 (FN), Cassini\_17 (FN), Cole\_18 (FF), Dirdigger\_20 (FF), Donatella\_19 (FF), Elesar\_19 (FF), GoodLuckBabe\_20 (FF), Guinevere\_20 (FF), Gusanita\_18 (FF), Halloweekend\_18 (FF), Ichiang\_18 (FF), IsHungry\_20 (FF), Julie\_20 (FF), Kihatsu\_21 (FF), Lenoxika\_20 (FF), MillySue\_20 (FF), Nandita\_20 (FF), Popper\_18 (FF), QuinnAvery\_20 (FF), Raqqa\_17 (AY), Ryan\_20 (FF), Saintcarr\_19 (FF), Schism\_20 (FF), ToastyOats\_22 (FF), Toodles\_20 (FF), Yonex\_20 (FF), Zaheer\_20 (FF),

Start 6:

- Found in 8 of 45 ( 17.8% ) of genes in pham
- Manual Annotations of this start: 7 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: A3Wally\_97 (GD1), Big4\_86 (GD2), Cece\_80 (GD3), Dodo\_99 (GD1), Erasmago\_88 (GD2), PauloDiaboli\_97 (GD1), Pumpernickel\_94 (GD4), Zooman\_82 (GD2),

Start 17:

- Found in 1 of 45 ( 2.2% ) of genes in pham
- Manual Annotations of this start: 1 of 36
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Magritte\_36 (singleton),

Start 42:

- Found in 5 of 45 ( 11.1% ) of genes in pham
- Manual Annotations of this start: 4 of 36
- Called 80.0% of time when present
- Phage (with cluster) where this start called: Bauer\_19 (FN), MrSmee\_16 (FQ1), Skitty\_16 (FQ1), Zucker\_18 (FN),

Start 72:

- Found in 36 of 45 ( 80.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 2.8% of time when present
- Phage (with cluster) where this start called: Merpity\_18 (FQ1),

**Summary by clusters:**

There are 9 clusters represented in this pham: GD1, GD2, GD3, GD4, singleton, FF, AY, FQ1, FN,

Info for manual annotations of cluster AY:

- Start number 3 was manually annotated 1 time for cluster AY.

Info for manual annotations of cluster FF:

- Start number 3 was manually annotated 22 times for cluster FF.

Info for manual annotations of cluster FN:

- Start number 3 was manually annotated 1 time for cluster FN.
- Start number 42 was manually annotated 2 times for cluster FN.

Info for manual annotations of cluster FQ1:

- Start number 42 was manually annotated 2 times for cluster FQ1.

Info for manual annotations of cluster GD1:

- Start number 6 was manually annotated 3 times for cluster GD1.

Info for manual annotations of cluster GD2:

- Start number 6 was manually annotated 2 times for cluster GD2.

Info for manual annotations of cluster GD3:

- Start number 6 was manually annotated 1 time for cluster GD3.

Info for manual annotations of cluster GD4:

- Start number 6 was manually annotated 1 time for cluster GD4.

**Gene Information:**

Gene: A3Wally\_97 Start: 51969, Stop: 56393, Start Num: 6

Candidate Starts for A3Wally\_97:

(Start: 6 @51969 has 7 MA's), (20, 52125), (23, 52170), (32, 52257), (36, 52371), (114, 53226), (117, 53247), (122, 53280), (125, 53382), (141, 53532), (150, 53628), (164, 53751), (178, 53847), (194, 53958), (202, 54039), (203, 54066), (216, 54207), (219, 54225), (222, 54246), (233, 54360), (239, 54393), (245, 54420), (259, 54495), (331, 54699), (333, 54708), (345, 54771), (350, 54804), (358, 54858), (381, 55041), (383, 55065), (384, 55068), (386, 55086), (399, 55230), (405, 55296), (410, 55353), (419, 55440), (425, 55491), (437, 55623), (441, 55665), (445, 55689), (447, 55704), (451, 55725), (452, 55749), (453, 55755), (466, 55833), (467, 55848), (475, 55968), (476, 55980), (479, 55998), (488, 56079), (490, 56130), (506, 56277), (509, 56292), (510, 56301), (518, 56358), (521, 56376),

Gene: AbbyDaisy\_17 Start: 9615, Stop: 14432, Start Num: 3

Candidate Starts for AbbyDaisy\_17:

(Start: 3 @9615 has 24 MA's), (13, 9735), (37, 10071), (39, 10119), (43, 10179), (46, 10221), (47, 10233), (55, 10350), (66, 10425), (72, 10482), (75, 10506), (76, 10512), (83, 10602), (87, 10623), (92, 10683), (95, 10725), (101, 10758), (102, 10764), (106, 10854), (128, 11160), (135, 11193), (148, 11334), (151, 11385), (155, 11436), (156, 11445), (169, 11529), (171, 11550), (176, 11595), (179, 11628), (190, 11694), (192, 11709), (195, 11730), (196, 11739), (197, 11760), (198, 11769), (201, 11793), (206, 11883), (212, 11934), (217, 11964), (221, 11985), (223, 12012), (231, 12108), (241, 12162), (246, 12204), (247, 12213), (250, 12222), (260, 12306), (261, 12309), (264, 12330), (265, 12333), (270, 12372), (273, 12393), (288, 12477), (295, 12510), (301, 12561), (307, 12606), (314, 12630), (325, 12681), (330, 12714), (334, 12741), (347, 12804), (351, 12837), (358, 12882), (367, 12939), (368, 12951), (382, 13080), (388, 13137), (398, 13260), (400, 13272), (411, 13434), (412, 13437), (413, 13443), (417, 13461), (420, 13479), (425, 13515), (426, 13530), (428, 13545), (438, 13671), (439, 13683), (443, 13707), (448, 13743), (458, 13821), (461, 13836), (474, 14013), (484, 14091), (485, 14100), (487, 14127), (489, 14136), (493, 14196), (498, 14229), (513, 14355),

Gene: AllBusiness\_19 Start: 11058, Stop: 15884, Start Num: 3

Candidate Starts for AllBusiness\_19:

(Start: 3 @11058 has 24 MA's), (5, 11088), (13, 11178), (39, 11562), (43, 11622), (46, 11661), (47, 11673), (55, 11790), (58, 11799), (68, 11895), (72, 11922), (75, 11946), (78, 11970), (83, 12042), (87, 12063), (88, 12075), (92, 12123), (95, 12165), (101, 12198), (102, 12204), (111, 12369), (120, 12441), (128, 12600), (144, 12738), (151, 12825), (155, 12876), (156, 12885), (168, 12966), (169, 12969), (171, 12990), (176, 13035), (184, 13092), (191, 13137), (194, 13164), (195, 13170), (196, 13179), (198, 13209), (206, 13323), (207, 13326), (209, 13344), (221, 13425), (223, 13452), (231, 13548), (241, 13602), (246, 13644), (247, 13653), (261, 13749), (265, 13773), (270, 13812), (273, 13833), (288, 13917), (295, 13950), (304, 14028), (310, 14058), (311, 14061), (330, 14154), (331, 14157), (334, 14181), (338, 14199), (339, 14208), (342, 14220), (349, 14256), (352, 14280), (354, 14298), (358, 14322), (361, 14337), (364, 14355), (367, 14379), (385, 14550), (398, 14700), (406, 14790), (407, 14808), (408, 14814), (409, 14841), (412, 14886), (413, 14892), (417, 14910), (420, 14928), (425, 14964), (427, 14982), (431, 15012), (435, 15063), (438, 15120), (439, 15132), (448, 15192), (457, 15264), (458, 15270), (461, 15285), (474, 15462), (478, 15489), (482, 15528), (483, 15531), (484, 15540), (485, 15549), (491, 15633), (498, 15690), (514, 15822), (517, 15846),

Gene: Bauer\_19 Start: 10992, Stop: 15116, Start Num: 42

Candidate Starts for Bauer\_19:

(Start: 42 @10992 has 4 MA's), (44, 11016), (49, 11067), (52, 11112), (53, 11124), (54, 11160), (69, 11280), (72, 11298), (73, 11304), (75, 11322), (78, 11346), (83, 11415), (92, 11496), (95, 11538), (98, 11613), (99, 11622), (106, 11763), (107, 11772), (120, 11910), (124, 12015), (137, 12228), (144, 12303), (148, 12339), (151, 12390), (154, 12423), (157, 12453), (161, 12510), (162, 12513), (169, 12534), (171, 12555), (176, 12600), (179, 12633), (187, 12675), (190, 12699), (191, 12702), (193, 12726), (194, 12729), (195, 12735), (196, 12744), (198, 12774), (214, 12954), (220, 12987), (221,

12990), (223, 13017), (241, 13167), (250, 13227), (252, 13239), (254, 13269), (261, 13314), (270, 13377), (280, 13440), (282, 13455), (285, 13473), (288, 13482), (316, 13596), (317, 13599), (322, 13623), (331, 13659), (332, 13665), (340, 13698), (348, 13731), (364, 13809), (395, 13992), (398, 14016), (400, 14028), (403, 14064), (417, 14199), (433, 14289), (435, 14307), (442, 14397), (443, 14400), (448, 14436), (458, 14511), (465, 14553), (469, 14601), (477, 14709), (478, 14712), (494, 14874), (497, 14895), (502, 14955), (511, 15003), (522, 15081), (523, 15084), (524, 15093), (525, 15102), (526, 15105),

Gene: BellaJr\_19 Start: 11008, Stop: 15927, Start Num: 3

Candidate Starts for BellaJr\_19:

(Start: 3 @11008 has 24 MA's), (4, 11032), (5, 11038), (10, 11083), (13, 11128), (14, 11140), (21, 11206), (23, 11248), (27, 11281), (39, 11512), (40, 11521), (41, 11554), (43, 11572), (46, 11611), (47, 11623), (54, 11734), (68, 11845), (70, 11857), (72, 11872), (75, 11896), (76, 11902), (78, 11920), (83, 11992), (86, 12010), (87, 12013), (88, 12025), (95, 12115), (97, 12169), (101, 12244), (106, 12340), (107, 12349), (117, 12460), (120, 12487), (134, 12772), (139, 12826), (148, 12916), (151, 12967), (154, 13000), (155, 13018), (156, 13027), (157, 13030), (168, 13108), (169, 13111), (174, 13153), (176, 13177), (183, 13228), (184, 13234), (191, 13279), (195, 13312), (196, 13321), (201, 13375), (212, 13516), (221, 13567), (223, 13594), (230, 13672), (231, 13690), (241, 13744), (247, 13795), (250, 13804), (253, 13834), (266, 13921), (270, 13954), (279, 14014), (300, 14119), (310, 14152), (311, 14155), (321, 14194), (327, 14221), (331, 14236), (332, 14242), (340, 14275), (357, 14362), (374, 14494), (387, 14605), (398, 14731), (399, 14740), (402, 14767), (412, 14905), (413, 14911), (420, 14947), (425, 14983), (427, 15001), (432, 15034), (435, 15082), (436, 15085), (446, 15196), (448, 15211), (457, 15283), (459, 15295), (461, 15304), (474, 15481), (482, 15547), (484, 15559), (487, 15595), (489, 15604), (495, 15688), (510, 15814), (513, 15832), (519, 15871), (523, 15895), (524, 15904), (525, 15913), (526, 15916),

Gene: Big4\_86 Start: 50992, Stop: 55611, Start Num: 6

Candidate Starts for Big4\_86:

(Start: 6 @50992 has 7 MA's), (8, 51004), (9, 51013), (11, 51034), (23, 51193), (36, 51394), (85, 51901), (89, 51940), (108, 52171), (114, 52240), (122, 52294), (129, 52444), (131, 52459), (147, 52609), (158, 52717), (159, 52732), (163, 52759), (166, 52768), (189, 52918), (194, 52963), (199, 53017), (203, 53071), (210, 53158), (221, 53236), (226, 53272), (233, 53362), (238, 53392), (240, 53404), (242, 53413), (246, 53446), (249, 53461), (261, 53545), (262, 53554), (269, 53602), (281, 53677), (289, 53704), (296, 53737), (301, 53770), (302, 53782), (313, 53836), (343, 53968), (350, 54016), (360, 54082), (366, 54112), (376, 54214), (382, 54256), (405, 54508), (410, 54565), (419, 54652), (421, 54673), (422, 54676), (425, 54703), (441, 54880), (445, 54904), (447, 54919), (451, 54940), (452, 54964), (466, 55051), (467, 55066), (476, 55198), (479, 55216), (488, 55297), (490, 55348), (506, 55495), (510, 55519), (520, 55588), (521, 55594),

Gene: BigSherm\_20 Start: 10998, Stop: 15812, Start Num: 3

Candidate Starts for BigSherm\_20:

(Start: 3 @10998 has 24 MA's), (5, 11028), (13, 11118), (29, 11286), (34, 11370), (37, 11454), (39, 11502), (43, 11562), (46, 11601), (47, 11613), (55, 11730), (58, 11739), (69, 11844), (72, 11862), (75, 11886), (83, 11982), (87, 12003), (88, 12015), (92, 12063), (101, 12138), (102, 12144), (111, 12309), (120, 12381), (128, 12540), (142, 12660), (144, 12678), (151, 12765), (154, 12798), (155, 12816), (156, 12825), (165, 12894), (168, 12906), (169, 12909), (176, 12975), (184, 13032), (190, 13074), (191, 13077), (195, 13110), (196, 13119), (198, 13149), (207, 13266), (209, 13284), (212, 13314), (221, 13365), (223, 13392), (247, 13593), (265, 13713), (270, 13752), (273, 13773), (284, 13845), (288, 13857), (295, 13890), (310, 13998), (311, 14001), (330, 14094), (333, 14115), (340, 14151), (347, 14184), (351, 14217), (359, 14271), (368, 14331), (371, 14379), (385, 14490), (392, 14595), (395, 14616), (398, 14640), (400, 14652), (407, 14736), (409, 14769), (412, 14814), (413, 14820), (417, 14838), (420, 14856), (425, 14892), (426, 14907), (427, 14910), (431, 14940), (435, 14991), (438, 15048), (439, 15060), (446, 15105), (448, 15120), (457, 15192), (458, 15198), (459, 15204),

(461, 15213), (474, 15390), (482, 15456), (483, 15459), (484, 15468), (491, 15561), (498, 15618), (517, 15774),

Gene: BlackSpider\_17 Start: 10004, Stop: 14773, Start Num: 3

Candidate Starts for BlackSpider\_17:

(Start: 3 @10004 has 24 MA's), (4, 10028), (5, 10034), (10, 10079), (13, 10124), (14, 10136), (21, 10202), (23, 10244), (27, 10277), (39, 10508), (40, 10517), (41, 10550), (43, 10568), (46, 10607), (47, 10619), (51, 10673), (54, 10730), (68, 10841), (70, 10853), (72, 10868), (75, 10892), (76, 10898), (78, 10916), (83, 10988), (86, 11006), (87, 11009), (88, 11021), (95, 11111), (101, 11240), (106, 11336), (107, 11345), (117, 11456), (120, 11483), (134, 11768), (139, 11822), (148, 11912), (151, 11963), (154, 11996), (155, 12014), (156, 12023), (157, 12026), (168, 12104), (169, 12107), (174, 12149), (176, 12173), (183, 12224), (184, 12230), (191, 12275), (195, 12308), (196, 12317), (201, 12371), (212, 12512), (221, 12563), (223, 12590), (230, 12668), (231, 12686), (241, 12740), (246, 12782), (247, 12791), (266, 12917), (273, 12971), (276, 12998), (280, 13013), (295, 13088), (303, 13139), (310, 13148), (340, 13250), (344, 13265), (362, 13349), (390, 13514), (398, 13568), (412, 13745), (413, 13751), (417, 13769), (420, 13787), (425, 13823), (427, 13841), (432, 13874), (435, 13922), (436, 13925), (446, 14036), (448, 14051), (457, 14123), (459, 14135), (461, 14144), (473, 14315), (474, 14321), (482, 14387), (484, 14399), (487, 14435), (489, 14444), (495, 14534), (504, 14618), (510, 14660), (513, 14678), (523, 14741), (524, 14750), (525, 14759), (526, 14762),

Gene: Cassini\_17 Start: 9972, Stop: 15008, Start Num: 3

Candidate Starts for Cassini\_17:

(Start: 3 @9972 has 24 MA's), (4, 9996), (5, 10002), (10, 10047), (13, 10092), (14, 10104), (23, 10212), (29, 10260), (39, 10476), (41, 10518), (43, 10536), (46, 10575), (47, 10587), (51, 10641), (54, 10698), (59, 10725), (68, 10809), (72, 10836), (75, 10860), (76, 10866), (78, 10884), (83, 10956), (86, 10974), (87, 10977), (88, 10989), (95, 11079), (98, 11154), (101, 11208), (106, 11304), (107, 11313), (116, 11421), (117, 11424), (120, 11451), (134, 11736), (148, 11880), (151, 11931), (155, 11982), (156, 11991), (165, 12060), (168, 12072), (169, 12075), (174, 12117), (176, 12141), (183, 12192), (184, 12198), (191, 12243), (195, 12276), (196, 12285), (221, 12531), (223, 12558), (231, 12654), (234, 12666), (241, 12708), (246, 12750), (247, 12759), (266, 12885), (270, 12918), (279, 12978), (294, 13053), (295, 13056), (300, 13104), (305, 13137), (310, 13164), (323, 13218), (326, 13245), (328, 13251), (334, 13287), (338, 13305), (342, 13326), (350, 13377), (357, 13425), (359, 13437), (361, 13443), (368, 13497), (369, 13518), (398, 13806), (399, 13815), (411, 13977), (412, 13980), (413, 13986), (417, 14004), (420, 14022), (425, 14058), (427, 14076), (432, 14109), (436, 14160), (439, 14226), (448, 14286), (457, 14358), (458, 14364), (461, 14379), (474, 14556), (482, 14622), (484, 14634), (487, 14670), (489, 14679), (510, 14895), (513, 14913), (519, 14952), (523, 14976), (524, 14985), (525, 14994), (526, 14997),

Gene: Cece\_80 Start: 46891, Stop: 50733, Start Num: 6

Candidate Starts for Cece\_80:

(Start: 6 @46891 has 7 MA's), (18, 47023), (22, 47068), (36, 47290), (48, 47467), (93, 47911), (105, 48070), (112, 48166), (115, 48187), (126, 48364), (130, 48391), (138, 48454), (140, 48481), (144, 48514), (160, 48715), (163, 48724), (179, 48835), (180, 48838), (181, 48847), (223, 49228), (224, 49231), (232, 49297), (233, 49300), (239, 49333), (244, 49357), (253, 49390), (261, 49444), (263, 49462), (273, 49525), (275, 49543), (287, 49573), (292, 49591), (325, 49639), (337, 49708), (341, 49723), (346, 49747), (349, 49762), (353, 49789), (363, 49855), (365, 49861), (375, 49969), (379, 49999), (394, 50152), (396, 50158), (397, 50170), (404, 50221), (415, 50359), (416, 50362), (423, 50404), (424, 50416), (434, 50512), (441, 50593), (445, 50617), (449, 50641), (454, 50695), (455, 50698),

Gene: Cole\_18 Start: 10660, Stop: 15474, Start Num: 3

Candidate Starts for Cole\_18:

(Start: 3 @10660 has 24 MA's), (5, 10690), (13, 10780), (29, 10948), (34, 11032), (37, 11116), (39, 11164), (43, 11224), (46, 11263), (47, 11275), (55, 11392), (58, 11401), (69, 11506), (72, 11524), (75, 11548), (83, 11644), (87, 11665), (88, 11677), (92, 11725), (101, 11800), (102, 11806), (111, 11971), (120, 12043), (128, 12202), (142, 12322), (144, 12340), (151, 12427), (154, 12460), (155, 12478), (156, 12487), (165, 12556), (168, 12568), (169, 12571), (171, 12592), (176, 12637), (184, 12694), (190, 12736), (191, 12739), (195, 12772), (196, 12781), (198, 12811), (207, 12928), (209, 12946), (212, 12976), (221, 13027), (223, 13054), (231, 13150), (239, 13192), (247, 13255), (265, 13375), (270, 13414), (273, 13435), (284, 13507), (288, 13519), (295, 13552), (310, 13660), (311, 13663), (319, 13699), (330, 13756), (333, 13777), (340, 13813), (347, 13846), (349, 13858), (351, 13879), (359, 13933), (368, 13993), (371, 14041), (385, 14152), (392, 14257), (395, 14278), (398, 14302), (400, 14314), (407, 14398), (409, 14431), (412, 14476), (413, 14482), (417, 14500), (420, 14518), (425, 14554), (426, 14569), (427, 14572), (431, 14602), (435, 14653), (438, 14710), (439, 14722), (446, 14767), (448, 14782), (457, 14854), (459, 14866), (461, 14875), (474, 15052), (482, 15118), (483, 15121), (484, 15130), (489, 15175), (491, 15223), (498, 15280), (517, 15436),

Gene: Dirtdigger\_20 Start: 10978, Stop: 15792, Start Num: 3

Candidate Starts for Dirtdigger\_20:

(Start: 3 @10978 has 24 MA's), (5, 11008), (13, 11098), (14, 11110), (23, 11218), (30, 11281), (37, 11434), (39, 11482), (43, 11542), (46, 11581), (47, 11593), (55, 11710), (58, 11719), (68, 11815), (72, 11842), (75, 11866), (83, 11962), (87, 11983), (88, 11995), (92, 12043), (101, 12118), (102, 12124), (111, 12289), (120, 12361), (128, 12520), (144, 12658), (151, 12745), (152, 12751), (155, 12796), (156, 12805), (168, 12886), (169, 12889), (171, 12910), (176, 12955), (177, 12964), (184, 13012), (190, 13054), (191, 13057), (194, 13084), (195, 13090), (196, 13099), (198, 13129), (206, 13243), (207, 13246), (209, 13264), (212, 13294), (217, 13324), (221, 13345), (223, 13372), (231, 13468), (241, 13522), (246, 13564), (247, 13573), (254, 13624), (265, 13693), (273, 13753), (288, 13837), (293, 13858), (295, 13870), (304, 13948), (310, 13978), (311, 13981), (323, 14032), (325, 14041), (330, 14074), (331, 14077), (333, 14095), (334, 14101), (339, 14128), (347, 14164), (349, 14176), (351, 14197), (359, 14251), (368, 14311), (382, 14440), (398, 14620), (399, 14629), (400, 14632), (407, 14716), (409, 14749), (412, 14794), (413, 14800), (417, 14818), (420, 14836), (425, 14872), (427, 14890), (431, 14920), (435, 14971), (438, 15028), (439, 15040), (443, 15064), (448, 15100), (457, 15172), (461, 15193), (474, 15370), (482, 15436), (483, 15439), (485, 15457), (491, 15541), (498, 15598), (514, 15730), (517, 15754),

Gene: Dodo\_99 Start: 52291, Stop: 56715, Start Num: 6

Candidate Starts for Dodo\_99:

(Start: 6 @52291 has 7 MA's), (20, 52447), (23, 52492), (32, 52579), (36, 52693), (114, 53548), (117, 53569), (122, 53602), (125, 53704), (141, 53854), (150, 53950), (164, 54073), (178, 54169), (194, 54280), (202, 54361), (203, 54388), (216, 54529), (219, 54547), (222, 54568), (233, 54682), (239, 54715), (245, 54742), (259, 54817), (331, 55021), (333, 55030), (345, 55093), (350, 55126), (358, 55180), (381, 55363), (383, 55387), (384, 55390), (386, 55408), (399, 55552), (405, 55618), (407, 55642), (410, 55675), (419, 55762), (425, 55813), (437, 55945), (441, 55987), (445, 56011), (447, 56026), (451, 56047), (452, 56071), (453, 56077), (466, 56155), (467, 56170), (476, 56302), (479, 56320), (488, 56401), (490, 56452), (506, 56599), (509, 56614), (510, 56623), (518, 56680), (521, 56698),

Gene: Donatella\_19 Start: 11124, Stop: 15938, Start Num: 3

Candidate Starts for Donatella\_19:

(Start: 3 @11124 has 24 MA's), (5, 11154), (13, 11244), (34, 11496), (37, 11580), (39, 11628), (43, 11688), (46, 11727), (47, 11739), (55, 11856), (58, 11865), (69, 11970), (72, 11988), (75, 12012), (83, 12108), (87, 12129), (88, 12141), (92, 12189), (95, 12231), (101, 12264), (102, 12270), (111, 12435), (120, 12507), (128, 12666), (142, 12786), (144, 12804), (151, 12891), (154, 12924), (155, 12942), (156, 12951), (165, 13020), (168, 13032), (169, 13035), (171, 13056), (176, 13101), (184, 13158), (190, 13200), (191, 13203), (195, 13236), (196, 13245), (198, 13275), (207, 13392), (209, 13410),

(212, 13440), (221, 13491), (223, 13518), (231, 13614), (239, 13656), (243, 13680), (247, 13719), (265, 13839), (270, 13878), (273, 13899), (284, 13971), (288, 13983), (295, 14016), (310, 14124), (311, 14127), (330, 14220), (333, 14241), (340, 14277), (347, 14310), (349, 14322), (351, 14343), (359, 14397), (367, 14445), (368, 14457), (371, 14505), (385, 14616), (392, 14721), (398, 14766), (400, 14778), (407, 14862), (409, 14895), (412, 14940), (413, 14946), (417, 14964), (420, 14982), (425, 15018), (426, 15033), (427, 15036), (431, 15066), (435, 15117), (438, 15174), (439, 15186), (446, 15231), (448, 15246), (457, 15318), (459, 15330), (461, 15339), (474, 15516), (483, 15585), (484, 15594), (491, 15687), (498, 15744), (499, 15747), (517, 15900),

Gene: Elesar\_19 Start: 11042, Stop: 15865, Start Num: 3

Candidate Starts for Elesar\_19:

(1, 10970), (2, 10994), (Start: 3 @11042 has 24 MA's), (7, 11093), (13, 11162), (22, 11261), (23, 11282), (39, 11546), (41, 11588), (43, 11606), (46, 11645), (47, 11657), (54, 11768), (60, 11798), (72, 11906), (82, 12005), (83, 12026), (86, 12044), (87, 12047), (92, 12107), (102, 12188), (109, 12323), (144, 12722), (151, 12809), (155, 12860), (169, 12953), (171, 12974), (176, 13019), (177, 13028), (182, 13067), (183, 13070), (191, 13121), (193, 13145), (195, 13154), (196, 13163), (205, 13277), (212, 13358), (221, 13409), (223, 13436), (230, 13514), (231, 13532), (241, 13586), (246, 13628), (266, 13763), (272, 13805), (273, 13817), (276, 13844), (295, 13934), (305, 14015), (311, 14045), (315, 14057), (323, 14096), (325, 14105), (328, 14129), (330, 14138), (331, 14141), (333, 14159), (334, 14165), (348, 14231), (349, 14240), (351, 14261), (352, 14264), (358, 14306), (359, 14315), (362, 14327), (368, 14375), (371, 14423), (373, 14444), (386, 14546), (395, 14660), (398, 14684), (407, 14780), (412, 14858), (413, 14864), (417, 14882), (420, 14900), (425, 14936), (431, 14984), (433, 15017), (435, 15035), (438, 15092), (448, 15164), (457, 15236), (459, 15248), (461, 15257), (480, 15470), (482, 15500), (484, 15512), (491, 15608), (499, 15680), (502, 15734), (514, 15803), (517, 15827),

Gene: Erasmago\_88 Start: 48589, Stop: 53256, Start Num: 6

Candidate Starts for Erasmago\_88:

(Start: 6 @48589 has 7 MA's), (8, 48601), (9, 48610), (23, 48790), (25, 48805), (31, 48862), (36, 48991), (114, 49837), (121, 49879), (127, 50029), (129, 50041), (131, 50056), (143, 50179), (150, 50248), (194, 50578), (199, 50632), (202, 50659), (203, 50686), (216, 50827), (219, 50845), (225, 50884), (227, 50902), (233, 50980), (236, 50998), (238, 51010), (242, 51034), (251, 51088), (255, 51130), (265, 51190), (283, 51304), (308, 51445), (310, 51451), (323, 51499), (336, 51577), (345, 51625), (350, 51658), (356, 51700), (370, 51808), (381, 51895), (383, 51919), (384, 51922), (399, 52084), (405, 52150), (410, 52207), (419, 52294), (421, 52315), (422, 52318), (425, 52345), (431, 52393), (445, 52546), (447, 52561), (451, 52582), (466, 52693), (467, 52708), (475, 52828), (476, 52840), (479, 52858), (490, 52990), (496, 53041), (503, 53113), (508, 53149), (509, 53152), (516, 53209), (520, 53233), (521, 53239),

Gene: GoodLuckBabe\_20 Start: 10954, Stop: 15768, Start Num: 3

Candidate Starts for GoodLuckBabe\_20:

(Start: 3 @10954 has 24 MA's), (5, 10984), (13, 11074), (29, 11242), (37, 11410), (39, 11458), (43, 11518), (46, 11557), (47, 11569), (55, 11686), (58, 11695), (68, 11791), (72, 11818), (83, 11938), (87, 11959), (88, 11971), (101, 12094), (102, 12100), (111, 12265), (120, 12337), (128, 12496), (142, 12616), (144, 12634), (151, 12721), (154, 12754), (155, 12772), (156, 12781), (165, 12850), (168, 12862), (169, 12865), (176, 12931), (184, 12988), (190, 13030), (191, 13033), (195, 13066), (196, 13075), (198, 13105), (207, 13222), (209, 13240), (212, 13270), (221, 13321), (223, 13348), (231, 13444), (243, 13510), (246, 13540), (247, 13549), (265, 13669), (270, 13708), (273, 13729), (276, 13756), (277, 13759), (288, 13813), (290, 13822), (295, 13846), (300, 13894), (302, 13909), (304, 13924), (310, 13954), (311, 13957), (330, 14050), (331, 14053), (333, 14071), (334, 14077), (340, 14107), (347, 14140), (349, 14152), (351, 14173), (359, 14227), (368, 14287), (371, 14335), (392, 14551), (398, 14596), (400, 14608), (407, 14692), (409, 14725), (412, 14770), (413, 14776), (417, 14794), (420, 14812), (425, 14848), (426, 14863), (427, 14866), (431, 14896), (435, 14947), (438,

15004), (439, 15016), (457, 15148), (459, 15160), (461, 15169), (474, 15346), (482, 15412), (483, 15415), (484, 15424), (489, 15469), (491, 15517), (498, 15574), (501, 15628), (514, 15706), (517, 15730),

Gene: Guinevere\_20 Start: 10985, Stop: 15799, Start Num: 3

Candidate Starts for Guinevere\_20:

(Start: 3 @10985 has 24 MA's), (5, 11015), (13, 11105), (29, 11273), (37, 11441), (39, 11489), (43, 11549), (46, 11588), (47, 11600), (55, 11717), (58, 11726), (68, 11822), (72, 11849), (83, 11969), (87, 11990), (88, 12002), (101, 12125), (102, 12131), (120, 12368), (128, 12527), (142, 12647), (144, 12665), (151, 12752), (154, 12785), (155, 12803), (156, 12812), (165, 12881), (168, 12893), (169, 12896), (176, 12962), (184, 13019), (191, 13064), (195, 13097), (196, 13106), (198, 13136), (207, 13253), (209, 13271), (212, 13301), (221, 13352), (223, 13379), (231, 13475), (246, 13571), (247, 13580), (265, 13700), (270, 13739), (273, 13760), (284, 13832), (288, 13844), (295, 13877), (302, 13940), (304, 13955), (310, 13985), (311, 13988), (330, 14081), (331, 14084), (334, 14108), (339, 14135), (349, 14183), (359, 14258), (368, 14318), (371, 14366), (392, 14582), (398, 14627), (400, 14639), (407, 14723), (409, 14756), (412, 14801), (413, 14807), (417, 14825), (420, 14843), (425, 14879), (426, 14894), (427, 14897), (431, 14927), (438, 15035), (439, 15047), (446, 15092), (457, 15179), (459, 15191), (461, 15200), (474, 15377), (482, 15443), (483, 15446), (484, 15455), (489, 15500), (491, 15548), (498, 15605), (501, 15659), (514, 15737), (517, 15761),

Gene: Gusanita\_18 Start: 10874, Stop: 15688, Start Num: 3

Candidate Starts for Gusanita\_18:

(Start: 3 @10874 has 24 MA's), (5, 10904), (13, 10994), (29, 11162), (34, 11246), (37, 11330), (39, 11378), (43, 11438), (46, 11477), (47, 11489), (55, 11606), (56, 11609), (58, 11615), (64, 11654), (69, 11720), (72, 11738), (75, 11762), (83, 11858), (87, 11879), (88, 11891), (92, 11939), (95, 11981), (101, 12014), (102, 12020), (111, 12185), (120, 12257), (128, 12416), (144, 12554), (151, 12641), (154, 12674), (155, 12692), (156, 12701), (165, 12770), (168, 12782), (169, 12785), (171, 12806), (176, 12851), (184, 12908), (188, 12929), (190, 12950), (191, 12953), (195, 12986), (196, 12995), (198, 13025), (200, 13046), (207, 13142), (209, 13160), (212, 13190), (221, 13241), (223, 13268), (230, 13346), (231, 13364), (246, 13460), (247, 13469), (265, 13589), (270, 13628), (273, 13649), (288, 13733), (295, 13766), (304, 13844), (310, 13874), (311, 13877), (330, 13970), (331, 13973), (334, 13997), (338, 14015), (339, 14024), (349, 14072), (358, 14138), (359, 14147), (364, 14171), (368, 14207), (373, 14276), (390, 14462), (395, 14492), (399, 14525), (400, 14528), (411, 14687), (412, 14690), (413, 14696), (417, 14714), (420, 14732), (425, 14768), (426, 14783), (427, 14786), (431, 14816), (435, 14867), (438, 14924), (439, 14936), (457, 15068), (459, 15080), (461, 15089), (474, 15266), (482, 15332), (484, 15344), (487, 15380), (491, 15437), (498, 15494), (517, 15650),

Gene: Halloweekend\_18 Start: 10624, Stop: 15438, Start Num: 3

Candidate Starts for Halloweekend\_18:

(Start: 3 @10624 has 24 MA's), (5, 10654), (13, 10744), (29, 10912), (34, 10996), (37, 11080), (39, 11128), (43, 11188), (46, 11227), (47, 11239), (55, 11356), (58, 11365), (69, 11470), (72, 11488), (75, 11512), (83, 11608), (87, 11629), (88, 11641), (92, 11689), (101, 11764), (102, 11770), (120, 12007), (128, 12166), (142, 12286), (144, 12304), (151, 12391), (154, 12424), (155, 12442), (156, 12451), (165, 12520), (168, 12532), (169, 12535), (176, 12601), (184, 12658), (190, 12700), (191, 12703), (195, 12736), (196, 12745), (198, 12775), (207, 12892), (209, 12910), (212, 12940), (221, 12991), (223, 13018), (247, 13219), (265, 13339), (270, 13378), (273, 13399), (284, 13471), (288, 13483), (295, 13516), (310, 13624), (311, 13627), (330, 13720), (333, 13741), (340, 13777), (347, 13810), (351, 13843), (359, 13897), (368, 13957), (371, 14005), (385, 14116), (392, 14221), (395, 14242), (398, 14266), (400, 14278), (407, 14362), (409, 14395), (412, 14440), (413, 14446), (417, 14464), (420, 14482), (425, 14518), (426, 14533), (427, 14536), (431, 14566), (435, 14617), (438, 14674), (439, 14686), (446, 14731), (448, 14746), (457, 14818), (458, 14824), (459, 14830), (461, 14839), (474, 15016), (482, 15082), (483, 15085), (484, 15094), (491, 15187), (498, 15244), (517, 15400),

Gene: Ichiang\_18 Start: 10641, Stop: 15455, Start Num: 3

Candidate Starts for Ichiang\_18:

(Start: 3 @10641 has 24 MA's), (5, 10671), (13, 10761), (29, 10929), (37, 11097), (39, 11145), (43, 11205), (46, 11244), (47, 11256), (55, 11373), (58, 11382), (68, 11478), (72, 11505), (75, 11529), (83, 11625), (87, 11646), (88, 11658), (92, 11706), (101, 11781), (102, 11787), (111, 11952), (120, 12024), (128, 12183), (142, 12303), (144, 12321), (151, 12408), (154, 12441), (155, 12459), (156, 12468), (165, 12537), (168, 12549), (169, 12552), (171, 12573), (176, 12618), (184, 12675), (190, 12717), (191, 12720), (195, 12753), (196, 12762), (198, 12792), (207, 12909), (209, 12927), (212, 12957), (221, 13008), (223, 13035), (231, 13131), (239, 13173), (243, 13197), (247, 13236), (265, 13356), (270, 13395), (273, 13416), (284, 13488), (288, 13500), (295, 13533), (310, 13641), (311, 13644), (330, 13737), (333, 13758), (340, 13794), (347, 13827), (349, 13839), (351, 13860), (359, 13914), (367, 13962), (368, 13974), (371, 14022), (385, 14133), (392, 14238), (398, 14283), (400, 14295), (407, 14379), (409, 14412), (412, 14457), (413, 14463), (417, 14481), (420, 14499), (425, 14535), (426, 14550), (427, 14553), (431, 14583), (435, 14634), (438, 14691), (439, 14703), (446, 14748), (448, 14763), (457, 14835), (459, 14847), (461, 14856), (474, 15033), (483, 15102), (484, 15111), (491, 15204), (498, 15261), (499, 15264), (517, 15417),

Gene: IsHungry\_20 Start: 10951, Stop: 15765, Start Num: 3

Candidate Starts for IsHungry\_20:

(Start: 3 @10951 has 24 MA's), (5, 10981), (13, 11071), (14, 11083), (37, 11407), (39, 11455), (43, 11515), (46, 11554), (47, 11566), (55, 11683), (58, 11692), (72, 11815), (75, 11839), (79, 11875), (83, 11935), (87, 11956), (88, 11968), (95, 12058), (101, 12091), (102, 12097), (111, 12262), (120, 12334), (128, 12493), (144, 12631), (151, 12718), (155, 12769), (156, 12778), (161, 12838), (169, 12862), (171, 12883), (176, 12928), (177, 12937), (184, 12985), (190, 13027), (191, 13030), (195, 13063), (196, 13072), (198, 13102), (206, 13216), (209, 13237), (212, 13267), (221, 13318), (223, 13345), (231, 13441), (237, 13474), (246, 13537), (265, 13666), (270, 13705), (273, 13726), (277, 13756), (288, 13810), (295, 13843), (300, 13891), (302, 13906), (311, 13954), (323, 14005), (330, 14047), (331, 14050), (333, 14068), (334, 14074), (339, 14101), (347, 14137), (349, 14149), (351, 14170), (359, 14224), (367, 14272), (368, 14284), (382, 14413), (388, 14470), (395, 14569), (398, 14593), (400, 14605), (412, 14770), (413, 14776), (417, 14794), (420, 14812), (425, 14848), (426, 14863), (427, 14866), (438, 15004), (439, 15016), (457, 15148), (459, 15160), (461, 15169), (474, 15346), (478, 15373), (483, 15415), (484, 15424), (491, 15517), (498, 15574), (514, 15703), (517, 15727),

Gene: Julie\_20 Start: 11214, Stop: 16028, Start Num: 3

Candidate Starts for Julie\_20:

(Start: 3 @11214 has 24 MA's), (5, 11244), (12, 11310), (13, 11334), (14, 11346), (19, 11391), (37, 11670), (39, 11718), (43, 11778), (46, 11817), (47, 11829), (55, 11946), (58, 11955), (68, 12051), (72, 12078), (75, 12102), (83, 12198), (87, 12219), (88, 12231), (92, 12279), (101, 12354), (102, 12360), (120, 12597), (128, 12756), (144, 12894), (151, 12981), (152, 12987), (155, 13032), (156, 13041), (168, 13122), (169, 13125), (171, 13146), (176, 13191), (177, 13200), (184, 13248), (190, 13290), (191, 13293), (194, 13320), (195, 13326), (196, 13335), (198, 13365), (206, 13479), (207, 13482), (209, 13500), (221, 13581), (223, 13608), (230, 13686), (231, 13704), (246, 13800), (247, 13809), (265, 13929), (270, 13968), (273, 13989), (288, 14073), (293, 14094), (295, 14106), (304, 14184), (310, 14214), (311, 14217), (330, 14310), (331, 14313), (334, 14337), (338, 14355), (339, 14364), (358, 14478), (359, 14487), (364, 14511), (368, 14547), (373, 14616), (390, 14802), (395, 14832), (398, 14856), (399, 14865), (400, 14868), (407, 14952), (412, 15030), (413, 15036), (417, 15054), (420, 15072), (425, 15108), (426, 15123), (427, 15126), (431, 15156), (435, 15207), (438, 15264), (439, 15276), (448, 15336), (457, 15408), (461, 15429), (474, 15606), (482, 15672), (483, 15675), (484, 15684), (485, 15693), (491, 15777), (498, 15834), (514, 15966), (517, 15990),

Gene: Kihatsu\_21 Start: 11307, Stop: 16121, Start Num: 3

Candidate Starts for Kihatsu\_21:

(Start: 3 @11307 has 24 MA's), (5, 11337), (13, 11427), (29, 11595), (37, 11763), (39, 11811), (43, 11871), (46, 11910), (47, 11922), (55, 12039), (58, 12048), (68, 12144), (72, 12171), (83, 12291), (87, 12312), (88, 12324), (102, 12453), (111, 12618), (120, 12690), (128, 12849), (142, 12969), (144, 12987), (151, 13074), (154, 13107), (155, 13125), (156, 13134), (165, 13203), (168, 13215), (169, 13218), (176, 13284), (184, 13341), (191, 13386), (195, 13419), (196, 13428), (198, 13458), (207, 13575), (209, 13593), (212, 13623), (221, 13674), (223, 13701), (231, 13797), (246, 13893), (247, 13902), (265, 14022), (270, 14061), (273, 14082), (276, 14109), (277, 14112), (284, 14154), (288, 14166), (290, 14175), (295, 14199), (300, 14247), (302, 14262), (304, 14277), (310, 14307), (311, 14310), (330, 14403), (331, 14406), (333, 14424), (334, 14430), (347, 14493), (349, 14505), (351, 14526), (359, 14580), (368, 14640), (371, 14688), (372, 14700), (392, 14904), (398, 14949), (400, 14961), (407, 15045), (409, 15078), (412, 15123), (413, 15129), (417, 15147), (420, 15165), (425, 15201), (426, 15216), (427, 15219), (431, 15249), (435, 15300), (438, 15357), (439, 15369), (457, 15501), (459, 15513), (461, 15522), (474, 15699), (481, 15756), (483, 15768), (484, 15777), (489, 15822), (491, 15870), (498, 15927), (514, 16059), (517, 16083),

Gene: Lenoxika\_20 Start: 10987, Stop: 15795, Start Num: 3

Candidate Starts for Lenoxika\_20:

(Start: 3 @10987 has 24 MA's), (5, 11017), (13, 11107), (28, 11269), (29, 11275), (37, 11443), (39, 11491), (43, 11551), (46, 11590), (47, 11602), (55, 11719), (58, 11728), (69, 11833), (72, 11851), (75, 11875), (83, 11971), (84, 11977), (87, 11992), (88, 12004), (92, 12052), (101, 12127), (102, 12133), (128, 12529), (142, 12649), (144, 12667), (151, 12754), (154, 12787), (155, 12805), (156, 12814), (165, 12883), (168, 12895), (169, 12898), (176, 12964), (184, 13021), (191, 13066), (195, 13099), (196, 13108), (198, 13138), (207, 13255), (209, 13273), (212, 13303), (221, 13354), (223, 13381), (231, 13477), (246, 13573), (247, 13582), (265, 13702), (270, 13741), (273, 13762), (284, 13834), (288, 13846), (295, 13879), (302, 13942), (304, 13957), (310, 13987), (311, 13990), (330, 14083), (331, 14086), (334, 14110), (339, 14137), (349, 14185), (359, 14260), (368, 14320), (371, 14368), (392, 14584), (398, 14629), (400, 14641), (407, 14725), (409, 14758), (412, 14803), (413, 14809), (417, 14827), (420, 14845), (425, 14881), (426, 14896), (427, 14899), (431, 14929), (438, 15037), (439, 15049), (446, 15094), (457, 15181), (459, 15193), (461, 15202), (474, 15379), (482, 15445), (483, 15448), (484, 15457), (489, 15502), (491, 15544), (498, 15601), (499, 15604), (501, 15655), (514, 15733), (517, 15757),

Gene: Magritte\_36 Start: 31216, Stop: 35913, Start Num: 17

Candidate Starts for Magritte\_36:

(Start: 17 @31216 has 1 MA's), (26, 31312), (50, 31693), (57, 31780), (61, 31816), (62, 31819), (65, 31831), (71, 31894), (74, 31915), (76, 31933), (80, 31966), (81, 31975), (90, 32080), (91, 32092), (94, 32131), (110, 32371), (113, 32401), (145, 32746), (149, 32767), (151, 32815), (157, 32878), (172, 32980), (179, 33055), (180, 33058), (186, 33088), (208, 33301), (222, 33409), (257, 33685), (261, 33706), (278, 33820), (280, 33829), (299, 33934), (309, 33994), (318, 34021), (324, 34054), (329, 34087), (336, 34126), (355, 34234), (380, 34444), (393, 34600), (395, 34621), (410, 34789), (414, 34849), (418, 34873), (422, 34900), (430, 34969), (435, 35035), (440, 35107), (444, 35143), (450, 35182), (456, 35236), (460, 35254), (463, 35269), (464, 35281), (470, 35353), (471, 35398), (486, 35548), (492, 35662), (499, 35701), (500, 35755),

Gene: Merpity\_18 Start: 9052, Stop: 12855, Start Num: 72

Candidate Starts for Merpity\_18:

(Start: 42 @8746 has 4 MA's), (45, 8776), (49, 8821), (52, 8866), (53, 8878), (63, 8965), (69, 9034), (72, 9052), (73, 9058), (83, 9169), (90, 9226), (97, 9346), (100, 9388), (101, 9421), (106, 9517), (107, 9526), (118, 9643), (119, 9652), (120, 9664), (132, 9907), (133, 9919), (136, 9958), (139, 10003), (144, 10057), (148, 10093), (151, 10144), (154, 10177), (155, 10195), (161, 10264), (162, 10267), (167, 10282), (168, 10285), (169, 10288), (170, 10297), (175, 10342), (176, 10354), (179, 10387), (181, 10399), (183, 10405), (191, 10456), (193, 10480), (195, 10489), (196, 10498), (213, 10702), (214, 10708), (215, 10711), (221, 10744), (223, 10771), (230, 10849), (231, 10867), (241, 10921), (247,

10972), (250, 10981), (261, 11068), (262, 11077), (266, 11098), (270, 11131), (271, 11134), (274, 11155), (276, 11179), (277, 11182), (287, 11233), (295, 11269), (297, 11290), (312, 11320), (316, 11329), (320, 11353), (331, 11392), (340, 11431), (344, 11446), (364, 11542), (395, 11725), (398, 11749), (399, 11758), (400, 11761), (417, 11932), (429, 11983), (431, 11995), (435, 12040), (438, 12097), (448, 12169), (458, 12244), (462, 12262), (465, 12286), (469, 12334), (478, 12445), (489, 12541), (502, 12691), (512, 12748), (515, 12769), (519, 12799), (523, 12823), (524, 12832), (525, 12841), (526, 12844),

Gene: MillySue\_20 Start: 11000, Stop: 15814, Start Num: 3

Candidate Starts for MillySue\_20:

(Start: 3 @11000 has 24 MA's), (5, 11030), (13, 11120), (37, 11456), (39, 11504), (43, 11564), (46, 11603), (47, 11615), (55, 11732), (58, 11741), (68, 11837), (72, 11864), (75, 11888), (78, 11912), (83, 11984), (84, 11990), (87, 12005), (88, 12017), (92, 12065), (101, 12140), (102, 12146), (103, 12182), (111, 12311), (120, 12383), (128, 12542), (144, 12680), (151, 12767), (154, 12800), (155, 12818), (156, 12827), (169, 12911), (171, 12932), (176, 12977), (177, 12986), (184, 13034), (190, 13076), (191, 13079), (195, 13112), (196, 13121), (198, 13151), (206, 13265), (209, 13286), (221, 13367), (223, 13394), (231, 13490), (241, 13544), (246, 13586), (247, 13595), (254, 13646), (265, 13715), (270, 13754), (273, 13775), (288, 13859), (295, 13892), (304, 13970), (310, 14000), (311, 14003), (330, 14096), (331, 14099), (334, 14123), (338, 14141), (339, 14150), (342, 14162), (349, 14198), (354, 14240), (358, 14264), (359, 14273), (364, 14297), (371, 14381), (373, 14402), (378, 14426), (390, 14588), (391, 14594), (398, 14642), (399, 14651), (400, 14654), (402, 14678), (407, 14738), (409, 14771), (412, 14816), (413, 14822), (417, 14840), (420, 14858), (425, 14894), (426, 14909), (427, 14912), (435, 14993), (438, 15050), (439, 15062), (448, 15122), (457, 15194), (459, 15206), (461, 15215), (474, 15392), (482, 15458), (483, 15461), (484, 15470), (485, 15479), (491, 15563), (498, 15620), (514, 15752), (517, 15776),

Gene: MrSmee\_16 Start: 8746, Stop: 12855, Start Num: 42

Candidate Starts for MrSmee\_16:

(Start: 42 @8746 has 4 MA's), (45, 8776), (49, 8821), (52, 8866), (53, 8878), (63, 8965), (69, 9034), (72, 9052), (73, 9058), (83, 9169), (90, 9226), (97, 9346), (100, 9388), (101, 9421), (106, 9517), (107, 9526), (118, 9643), (119, 9652), (120, 9664), (132, 9907), (133, 9919), (136, 9958), (139, 10003), (144, 10057), (148, 10093), (151, 10144), (154, 10177), (155, 10195), (161, 10264), (162, 10267), (167, 10282), (168, 10285), (169, 10288), (170, 10297), (175, 10342), (176, 10354), (179, 10387), (181, 10399), (183, 10405), (191, 10456), (193, 10480), (195, 10489), (196, 10498), (213, 10702), (214, 10708), (215, 10711), (221, 10744), (223, 10771), (230, 10849), (231, 10867), (241, 10921), (247, 10972), (250, 10981), (261, 11068), (262, 11077), (266, 11098), (270, 11131), (271, 11134), (274, 11155), (276, 11179), (277, 11182), (287, 11233), (295, 11269), (297, 11290), (312, 11320), (316, 11329), (320, 11353), (331, 11392), (340, 11431), (344, 11446), (364, 11542), (395, 11725), (398, 11749), (399, 11758), (400, 11761), (417, 11932), (429, 11983), (431, 11995), (435, 12040), (438, 12097), (448, 12169), (458, 12244), (462, 12262), (465, 12286), (469, 12334), (478, 12445), (489, 12541), (502, 12691), (512, 12748), (515, 12769), (519, 12799), (523, 12823), (524, 12832), (525, 12841), (526, 12844),

Gene: Nandita\_20 Start: 10985, Stop: 15799, Start Num: 3

Candidate Starts for Nandita\_20:

(Start: 3 @10985 has 24 MA's), (5, 11015), (13, 11105), (29, 11273), (37, 11441), (39, 11489), (43, 11549), (46, 11588), (47, 11600), (55, 11717), (58, 11726), (68, 11822), (72, 11849), (83, 11969), (87, 11990), (88, 12002), (101, 12125), (102, 12131), (120, 12368), (128, 12527), (142, 12647), (144, 12665), (151, 12752), (154, 12785), (155, 12803), (156, 12812), (165, 12881), (168, 12893), (169, 12896), (176, 12962), (184, 13019), (191, 13064), (195, 13097), (196, 13106), (198, 13136), (207, 13253), (209, 13271), (212, 13301), (221, 13352), (223, 13379), (231, 13475), (246, 13571), (247, 13580), (265, 13700), (270, 13739), (273, 13760), (284, 13832), (288, 13844), (295, 13877), (302, 13940), (304, 13955), (310, 13985), (311, 13988), (330, 14081), (331, 14084), (334, 14108), (339,

14135), (349, 14183), (359, 14258), (368, 14318), (371, 14366), (392, 14582), (398, 14627), (400, 14639), (407, 14723), (409, 14756), (412, 14801), (413, 14807), (417, 14825), (420, 14843), (425, 14879), (426, 14894), (427, 14897), (431, 14927), (438, 15035), (439, 15047), (446, 15092), (457, 15179), (459, 15191), (461, 15200), (474, 15377), (482, 15443), (483, 15446), (484, 15455), (489, 15500), (491, 15548), (498, 15605), (501, 15659), (514, 15737), (517, 15761),

Gene: PauloDiaboli\_97 Start: 51326, Stop: 55750, Start Num: 6

Candidate Starts for PauloDiaboli\_97:

(Start: 6 @51326 has 7 MA's), (20, 51482), (23, 51527), (32, 51614), (36, 51728), (114, 52583), (117, 52604), (122, 52637), (125, 52739), (141, 52889), (150, 52985), (164, 53108), (178, 53204), (194, 53315), (202, 53396), (203, 53423), (216, 53564), (219, 53582), (222, 53603), (233, 53717), (239, 53750), (245, 53777), (259, 53852), (331, 54056), (333, 54065), (345, 54128), (350, 54161), (358, 54215), (381, 54398), (383, 54422), (384, 54425), (386, 54443), (399, 54587), (405, 54653), (407, 54677), (410, 54710), (419, 54797), (425, 54848), (437, 54980), (441, 55022), (445, 55046), (447, 55061), (451, 55082), (452, 55106), (453, 55112), (466, 55190), (467, 55205), (476, 55337), (479, 55355), (488, 55436), (490, 55487), (506, 55634), (509, 55649), (510, 55658), (518, 55715), (521, 55733),

Gene: Popper\_18 Start: 10512, Stop: 15323, Start Num: 3

Candidate Starts for Popper\_18:

(Start: 3 @10512 has 24 MA's), (5, 10542), (13, 10632), (14, 10644), (19, 10689), (28, 10794), (37, 10968), (39, 11016), (43, 11076), (46, 11118), (47, 11130), (55, 11247), (58, 11256), (68, 11352), (72, 11379), (83, 11499), (87, 11520), (88, 11532), (92, 11580), (101, 11655), (102, 11661), (106, 11751), (111, 11826), (120, 11898), (144, 12195), (151, 12282), (155, 12333), (156, 12342), (169, 12426), (170, 12435), (176, 12492), (184, 12549), (195, 12627), (196, 12636), (197, 12657), (198, 12666), (206, 12780), (209, 12801), (212, 12831), (221, 12882), (223, 12909), (231, 13005), (246, 13101), (247, 13110), (256, 13182), (261, 13206), (265, 13230), (266, 13236), (270, 13269), (273, 13290), (288, 13374), (293, 13395), (295, 13407), (306, 13497), (311, 13518), (325, 13578), (334, 13638), (338, 13656), (339, 13665), (342, 13677), (354, 13755), (358, 13779), (364, 13812), (368, 13848), (373, 13917), (377, 13938), (386, 14019), (398, 14157), (399, 14166), (400, 14169), (401, 14178), (407, 14253), (411, 14328), (412, 14331), (413, 14337), (417, 14355), (420, 14373), (425, 14409), (426, 14424), (427, 14427), (431, 14457), (438, 14565), (439, 14577), (443, 14601), (448, 14637), (457, 14709), (458, 14715), (459, 14721), (461, 14730), (474, 14907), (482, 14973), (483, 14976), (484, 14985), (489, 15030), (502, 15192), (507, 15222), (514, 15261), (517, 15285),

Gene: Pumpernickel\_94 Start: 52653, Stop: 56996, Start Num: 6

Candidate Starts for Pumpernickel\_94:

(Start: 6 @52653 has 7 MA's), (16, 52773), (23, 52854), (24, 52857), (28, 52896), (33, 52974), (35, 53034), (36, 53055), (77, 53469), (96, 53706), (122, 53961), (123, 54030), (131, 54126), (153, 54336), (164, 54435), (173, 54474), (185, 54573), (204, 54747), (209, 54819), (210, 54831), (217, 54873), (218, 54876), (238, 54984), (255, 55041), (258, 55059), (259, 55068), (265, 55101), (268, 55125), (291, 55215), (332, 55305), (335, 55323), (345, 55377), (350, 55410), (358, 55464), (370, 55560), (405, 55902), (410, 55959), (414, 56019), (419, 56046), (425, 56097), (437, 56229), (439, 56253), (466, 56439), (467, 56454), (475, 56574), (476, 56586), (479, 56604), (490, 56736), (496, 56787), (505, 56874), (508, 56895), (510, 56907), (520, 56976),

Gene: QuinnAvery\_20 Start: 10998, Stop: 15812, Start Num: 3

Candidate Starts for QuinnAvery\_20:

(Start: 3 @10998 has 24 MA's), (5, 11028), (13, 11118), (29, 11286), (34, 11370), (37, 11454), (39, 11502), (43, 11562), (46, 11601), (47, 11613), (55, 11730), (58, 11739), (69, 11844), (72, 11862), (75, 11886), (83, 11982), (87, 12003), (88, 12015), (92, 12063), (101, 12138), (102, 12144), (111, 12309), (120, 12381), (128, 12540), (142, 12660), (144, 12678), (151, 12765), (154, 12798), (155, 12816), (156, 12825), (165, 12894), (168, 12906), (169, 12909), (171, 12930), (176, 12975), (184, 13032),

(190, 13074), (191, 13077), (195, 13110), (196, 13119), (198, 13149), (207, 13266), (209, 13284), (212, 13314), (221, 13365), (223, 13392), (231, 13488), (247, 13593), (270, 13752), (273, 13773), (284, 13845), (288, 13857), (295, 13890), (310, 13998), (311, 14001), (330, 14094), (333, 14115), (340, 14151), (347, 14184), (349, 14196), (351, 14217), (359, 14271), (368, 14331), (369, 14352), (371, 14379), (385, 14490), (392, 14595), (395, 14616), (398, 14640), (400, 14652), (407, 14736), (409, 14769), (412, 14814), (413, 14820), (417, 14838), (420, 14856), (425, 14892), (426, 14907), (427, 14910), (431, 14940), (435, 14991), (438, 15048), (439, 15060), (446, 15105), (448, 15120), (457, 15192), (458, 15198), (459, 15204), (461, 15213), (474, 15390), (482, 15456), (483, 15459), (484, 15468), (489, 15513), (491, 15561), (498, 15618), (517, 15774),

Gene: Raqqa\_17 Start: 9916, Stop: 14730, Start Num: 3

Candidate Starts for Raqqa\_17:

(Start: 3 @9916 has 24 MA's), (5, 9946), (13, 10036), (19, 10093), (37, 10372), (39, 10420), (43, 10480), (46, 10522), (47, 10534), (55, 10651), (72, 10783), (75, 10807), (76, 10813), (83, 10903), (87, 10924), (95, 11026), (101, 11059), (102, 11065), (106, 11155), (111, 11230), (120, 11302), (128, 11461), (142, 11581), (144, 11599), (151, 11686), (154, 11719), (155, 11737), (156, 11746), (165, 11815), (168, 11827), (169, 11830), (171, 11851), (176, 11896), (184, 11953), (190, 11995), (191, 11998), (195, 12031), (196, 12040), (198, 12070), (207, 12187), (209, 12205), (212, 12235), (221, 12286), (223, 12313), (228, 12355), (229, 12358), (231, 12409), (243, 12475), (246, 12505), (247, 12514), (254, 12565), (265, 12634), (270, 12673), (273, 12694), (284, 12766), (288, 12778), (295, 12811), (304, 12889), (310, 12919), (311, 12922), (330, 13015), (331, 13018), (334, 13042), (339, 13069), (349, 13117), (359, 13192), (368, 13252), (371, 13300), (392, 13516), (398, 13561), (400, 13573), (407, 13657), (409, 13690), (412, 13735), (413, 13741), (417, 13759), (420, 13777), (425, 13813), (426, 13828), (427, 13831), (431, 13861), (435, 13912), (438, 13969), (439, 13981), (446, 14026), (448, 14041), (457, 14113), (459, 14125), (461, 14134), (474, 14311), (482, 14377), (484, 14389), (489, 14434), (498, 14527), (513, 14653),

Gene: Ryan\_20 Start: 11131, Stop: 15945, Start Num: 3

Candidate Starts for Ryan\_20:

(Start: 3 @11131 has 24 MA's), (5, 11161), (13, 11251), (29, 11419), (37, 11587), (39, 11635), (43, 11695), (46, 11734), (47, 11746), (55, 11863), (58, 11872), (72, 11995), (75, 12019), (83, 12115), (87, 12136), (88, 12148), (92, 12196), (95, 12238), (101, 12271), (102, 12277), (120, 12514), (128, 12673), (135, 12706), (142, 12793), (144, 12811), (151, 12898), (154, 12931), (155, 12949), (156, 12958), (165, 13027), (168, 13039), (169, 13042), (176, 13108), (184, 13165), (188, 13186), (190, 13207), (191, 13210), (195, 13243), (198, 13282), (207, 13399), (209, 13417), (212, 13447), (221, 13498), (223, 13525), (231, 13621), (243, 13687), (246, 13717), (247, 13726), (265, 13846), (270, 13885), (273, 13906), (276, 13933), (277, 13936), (288, 13990), (290, 13999), (295, 14023), (300, 14071), (302, 14086), (304, 14101), (310, 14131), (311, 14134), (330, 14227), (331, 14230), (333, 14248), (334, 14254), (340, 14284), (347, 14317), (349, 14329), (351, 14350), (359, 14404), (368, 14464), (371, 14512), (386, 14635), (398, 14773), (400, 14785), (407, 14869), (412, 14947), (413, 14953), (417, 14971), (420, 14989), (425, 15025), (426, 15040), (427, 15043), (431, 15073), (435, 15124), (438, 15181), (439, 15193), (457, 15325), (459, 15337), (461, 15346), (474, 15523), (482, 15589), (483, 15592), (484, 15601), (489, 15646), (491, 15694), (498, 15751), (501, 15805), (514, 15883), (517, 15907),

Gene: Saintcarr\_19 Start: 11008, Stop: 15822, Start Num: 3

Candidate Starts for Saintcarr\_19:

(Start: 3 @11008 has 24 MA's), (5, 11038), (13, 11128), (28, 11290), (29, 11296), (37, 11464), (39, 11512), (43, 11572), (46, 11611), (47, 11623), (55, 11740), (58, 11749), (72, 11872), (75, 11896), (83, 11992), (87, 12013), (88, 12025), (92, 12073), (101, 12148), (102, 12154), (111, 12319), (120, 12391), (128, 12550), (142, 12670), (144, 12688), (151, 12775), (154, 12808), (155, 12826), (156, 12835), (165, 12904), (169, 12919), (176, 12985), (184, 13042), (190, 13084), (191, 13087), (195, 13120), (196, 13129), (198, 13159), (207, 13276), (209, 13294), (212, 13324), (221, 13375), (223, 13402),

(231, 13498), (237, 13531), (243, 13564), (246, 13594), (247, 13603), (265, 13723), (270, 13762), (273, 13783), (284, 13855), (288, 13867), (295, 13900), (304, 13978), (330, 14104), (331, 14107), (334, 14131), (339, 14158), (349, 14206), (359, 14281), (368, 14341), (371, 14389), (392, 14605), (398, 14650), (400, 14662), (407, 14746), (412, 14824), (413, 14830), (417, 14848), (420, 14866), (425, 14902), (426, 14917), (427, 14920), (431, 14950), (435, 15001), (438, 15058), (439, 15070), (446, 15115), (448, 15130), (457, 15202), (459, 15214), (461, 15223), (474, 15400), (482, 15466), (483, 15469), (484, 15478), (489, 15523), (491, 15571), (498, 15628), (499, 15631), (517, 15784),

Gene: Schism\_20 Start: 10985, Stop: 15799, Start Num: 3

Candidate Starts for Schism\_20:

(Start: 3 @10985 has 24 MA's), (5, 11015), (13, 11105), (29, 11273), (37, 11441), (39, 11489), (43, 11549), (46, 11588), (47, 11600), (55, 11717), (58, 11726), (68, 11822), (72, 11849), (83, 11969), (87, 11990), (88, 12002), (101, 12125), (102, 12131), (120, 12368), (128, 12527), (142, 12647), (144, 12665), (151, 12752), (154, 12785), (155, 12803), (156, 12812), (165, 12881), (168, 12893), (169, 12896), (176, 12962), (184, 13019), (191, 13064), (195, 13097), (196, 13106), (198, 13136), (207, 13253), (209, 13271), (212, 13301), (221, 13352), (223, 13379), (231, 13475), (246, 13571), (247, 13580), (265, 13700), (270, 13739), (273, 13760), (284, 13832), (288, 13844), (295, 13877), (302, 13940), (304, 13955), (310, 13985), (311, 13988), (330, 14081), (331, 14084), (334, 14108), (339, 14135), (359, 14258), (368, 14318), (371, 14366), (392, 14582), (398, 14627), (400, 14639), (407, 14723), (409, 14756), (412, 14801), (413, 14807), (417, 14825), (420, 14843), (425, 14879), (426, 14894), (427, 14897), (431, 14927), (438, 15035), (439, 15047), (446, 15092), (457, 15179), (459, 15191), (461, 15200), (474, 15377), (482, 15443), (483, 15446), (484, 15455), (489, 15500), (491, 15548), (498, 15605), (501, 15659), (514, 15737), (517, 15761),

Gene: Skitty\_16 Start: 8746, Stop: 12855, Start Num: 42

Candidate Starts for Skitty\_16:

(Start: 42 @8746 has 4 MA's), (45, 8776), (49, 8821), (52, 8866), (53, 8878), (63, 8965), (69, 9034), (72, 9052), (73, 9058), (83, 9169), (90, 9226), (97, 9346), (98, 9367), (100, 9388), (101, 9421), (106, 9517), (107, 9526), (118, 9643), (119, 9652), (120, 9664), (132, 9907), (133, 9919), (136, 9958), (139, 10003), (144, 10057), (148, 10093), (151, 10144), (154, 10177), (155, 10195), (161, 10264), (162, 10267), (167, 10282), (168, 10285), (169, 10288), (170, 10297), (175, 10342), (176, 10354), (179, 10387), (181, 10399), (183, 10405), (191, 10456), (193, 10480), (195, 10489), (196, 10498), (213, 10702), (214, 10708), (215, 10711), (221, 10744), (223, 10771), (230, 10849), (231, 10867), (241, 10921), (247, 10972), (250, 10981), (261, 11068), (262, 11077), (266, 11098), (270, 11131), (271, 11134), (274, 11155), (276, 11179), (277, 11182), (287, 11233), (295, 11269), (297, 11290), (312, 11320), (316, 11329), (320, 11353), (331, 11392), (340, 11431), (344, 11446), (364, 11542), (395, 11725), (398, 11749), (399, 11758), (400, 11761), (417, 11932), (429, 11983), (431, 11995), (435, 12040), (438, 12097), (448, 12169), (458, 12244), (462, 12262), (465, 12286), (469, 12334), (478, 12445), (489, 12541), (502, 12691), (512, 12748), (515, 12769), (519, 12799), (523, 12823), (524, 12832), (525, 12841), (526, 12844),

Gene: ToastyOats\_22 Start: 11463, Stop: 16277, Start Num: 3

Candidate Starts for ToastyOats\_22:

(Start: 3 @11463 has 24 MA's), (5, 11493), (13, 11583), (29, 11751), (37, 11919), (39, 11967), (43, 12027), (46, 12066), (47, 12078), (55, 12195), (58, 12204), (69, 12309), (72, 12327), (75, 12351), (83, 12447), (87, 12468), (88, 12480), (92, 12528), (95, 12570), (101, 12603), (102, 12609), (111, 12774), (120, 12846), (128, 13005), (142, 13125), (144, 13143), (151, 13230), (154, 13263), (155, 13281), (156, 13290), (165, 13359), (168, 13371), (169, 13374), (176, 13440), (184, 13497), (190, 13539), (191, 13542), (195, 13575), (196, 13584), (198, 13614), (207, 13731), (209, 13749), (212, 13779), (220, 13827), (221, 13830), (223, 13857), (229, 13902), (231, 13953), (243, 14019), (246, 14049), (247, 14058), (254, 14109), (265, 14178), (270, 14217), (273, 14238), (284, 14310), (288, 14322), (295, 14355), (304, 14433), (310, 14463), (311, 14466), (330, 14559), (331, 14562), (334, 14586), (339, 14613), (349, 14661), (351, 14682), (359, 14736), (368, 14796), (371, 14844), (398, 15105),

(400, 15117), (407, 15201), (409, 15234), (412, 15279), (413, 15285), (417, 15303), (420, 15321), (425, 15357), (426, 15372), (427, 15375), (431, 15405), (435, 15456), (438, 15513), (439, 15525), (457, 15657), (459, 15669), (461, 15678), (474, 15855), (482, 15921), (483, 15924), (484, 15933), (489, 15978), (491, 16026), (498, 16083), (499, 16086), (517, 16239),

Gene: Toodles\_20 Start: 11209, Stop: 16023, Start Num: 3

Candidate Starts for Toodles\_20:

(Start: 3 @11209 has 24 MA's), (5, 11239), (12, 11305), (13, 11329), (14, 11341), (29, 11497), (37, 11665), (39, 11713), (43, 11773), (46, 11812), (47, 11824), (55, 11941), (58, 11950), (68, 12046), (72, 12073), (75, 12097), (78, 12121), (83, 12193), (87, 12214), (88, 12226), (101, 12349), (102, 12355), (111, 12520), (120, 12592), (128, 12751), (144, 12889), (151, 12976), (155, 13027), (156, 13036), (168, 13117), (169, 13120), (176, 13186), (184, 13243), (190, 13285), (191, 13288), (195, 13321), (196, 13330), (198, 13360), (206, 13474), (209, 13495), (221, 13576), (223, 13603), (241, 13753), (246, 13795), (247, 13804), (261, 13900), (265, 13924), (270, 13963), (273, 13984), (279, 14023), (288, 14068), (293, 14089), (295, 14101), (304, 14179), (310, 14209), (311, 14212), (330, 14305), (334, 14332), (338, 14350), (339, 14359), (342, 14371), (349, 14407), (354, 14449), (358, 14473), (359, 14482), (364, 14506), (371, 14590), (373, 14611), (378, 14635), (390, 14797), (391, 14803), (398, 14851), (399, 14860), (400, 14863), (402, 14887), (407, 14947), (409, 14980), (412, 15025), (413, 15031), (417, 15049), (420, 15067), (425, 15103), (427, 15121), (431, 15151), (435, 15202), (438, 15259), (439, 15271), (448, 15331), (457, 15403), (458, 15409), (459, 15415), (461, 15424), (474, 15601), (478, 15628), (482, 15667), (483, 15670), (484, 15679), (485, 15688), (491, 15772), (498, 15829), (514, 15961), (517, 15985),

Gene: Yonex\_20 Start: 11131, Stop: 15945, Start Num: 3

Candidate Starts for Yonex\_20:

(Start: 3 @11131 has 24 MA's), (5, 11161), (13, 11251), (29, 11419), (37, 11587), (39, 11635), (43, 11695), (46, 11734), (47, 11746), (55, 11863), (58, 11872), (72, 11995), (75, 12019), (83, 12115), (87, 12136), (88, 12148), (92, 12196), (95, 12238), (101, 12271), (102, 12277), (120, 12514), (128, 12673), (135, 12706), (142, 12793), (144, 12811), (151, 12898), (154, 12931), (155, 12949), (156, 12958), (165, 13027), (168, 13039), (169, 13042), (176, 13108), (184, 13165), (188, 13186), (190, 13207), (191, 13210), (195, 13243), (198, 13282), (207, 13399), (209, 13417), (212, 13447), (221, 13498), (223, 13525), (231, 13621), (243, 13687), (246, 13717), (247, 13726), (265, 13846), (270, 13885), (273, 13906), (276, 13933), (277, 13936), (288, 13990), (290, 13999), (295, 14023), (300, 14071), (302, 14086), (304, 14101), (310, 14131), (311, 14134), (330, 14227), (331, 14230), (333, 14248), (334, 14254), (340, 14284), (347, 14317), (349, 14329), (351, 14350), (359, 14404), (368, 14464), (371, 14512), (386, 14635), (398, 14773), (400, 14785), (407, 14869), (412, 14947), (413, 14953), (417, 14971), (420, 14989), (425, 15025), (426, 15040), (427, 15043), (431, 15073), (435, 15124), (438, 15181), (439, 15193), (457, 15325), (459, 15337), (461, 15346), (474, 15523), (482, 15589), (483, 15592), (484, 15601), (489, 15646), (491, 15694), (498, 15751), (501, 15805), (514, 15883), (517, 15907),

Gene: Zaheer\_20 Start: 11220, Stop: 16034, Start Num: 3

Candidate Starts for Zaheer\_20:

(Start: 3 @11220 has 24 MA's), (5, 11250), (13, 11340), (15, 11364), (29, 11508), (37, 11676), (39, 11724), (43, 11784), (46, 11823), (47, 11835), (55, 11952), (58, 11961), (67, 12039), (68, 12057), (69, 12066), (72, 12084), (75, 12108), (83, 12204), (87, 12225), (88, 12237), (92, 12285), (101, 12360), (102, 12366), (111, 12531), (120, 12603), (128, 12762), (142, 12882), (144, 12900), (151, 12987), (154, 13020), (155, 13038), (156, 13047), (165, 13116), (168, 13128), (169, 13131), (171, 13152), (176, 13197), (184, 13254), (188, 13275), (190, 13296), (191, 13299), (195, 13332), (196, 13341), (198, 13371), (207, 13488), (209, 13506), (212, 13536), (221, 13587), (223, 13614), (231, 13710), (246, 13806), (247, 13815), (265, 13935), (270, 13974), (273, 13995), (276, 14022), (277, 14025), (284, 14067), (288, 14079), (290, 14088), (295, 14112), (300, 14160), (302, 14175), (304, 14190), (310, 14220), (311, 14223), (330, 14316), (331, 14319), (333, 14337), (334, 14343), (340, 14373),

(347, 14406), (349, 14418), (351, 14439), (359, 14493), (368, 14553), (371, 14601), (392, 14817), (398, 14862), (400, 14874), (407, 14958), (409, 14991), (412, 15036), (413, 15042), (417, 15060), (420, 15078), (425, 15114), (426, 15129), (427, 15132), (431, 15162), (438, 15270), (439, 15282), (457, 15414), (459, 15426), (461, 15435), (474, 15612), (482, 15678), (483, 15681), (484, 15690), (489, 15735), (491, 15783), (498, 15840), (501, 15894), (514, 15972), (517, 15996),

Gene: Zooman\_82 Start: 49648, Stop: 54291, Start Num: 6

Candidate Starts for Zooman\_82:

(Start: 6 @49648 has 7 MA's), (8, 49660), (9, 49669), (11, 49690), (23, 49849), (36, 50050), (38, 50080), (108, 50827), (114, 50896), (121, 50938), (122, 50950), (131, 51115), (140, 51199), (146, 51262), (147, 51265), (158, 51373), (173, 51457), (189, 51574), (194, 51619), (199, 51673), (203, 51727), (210, 51814), (211, 51826), (221, 51892), (226, 51928), (233, 52018), (235, 52027), (248, 52114), (261, 52210), (267, 52246), (269, 52267), (286, 52360), (289, 52369), (296, 52402), (298, 52426), (302, 52447), (313, 52501), (349, 52666), (352, 52690), (376, 52879), (382, 52921), (405, 53173), (410, 53230), (419, 53317), (421, 53338), (422, 53341), (425, 53368), (431, 53416), (466, 53719), (467, 53734), (468, 53743), (472, 53839), (476, 53875), (479, 53893), (490, 54028), (506, 54175), (510, 54199), (521, 54274),

Gene: Zucker\_18 Start: 10305, Stop: 14429, Start Num: 42

Candidate Starts for Zucker\_18:

(Start: 42 @10305 has 4 MA's), (44, 10329), (49, 10380), (52, 10425), (53, 10437), (54, 10473), (68, 10584), (69, 10593), (72, 10611), (73, 10617), (75, 10635), (78, 10659), (83, 10728), (87, 10749), (92, 10809), (95, 10851), (98, 10926), (99, 10935), (104, 11046), (106, 11076), (107, 11085), (120, 11223), (124, 11328), (137, 11541), (144, 11616), (148, 11652), (151, 11703), (154, 11736), (157, 11766), (161, 11823), (162, 11826), (169, 11847), (171, 11868), (176, 11913), (179, 11946), (184, 11970), (187, 11988), (190, 12012), (191, 12015), (193, 12039), (194, 12042), (195, 12048), (196, 12057), (198, 12087), (214, 12267), (220, 12300), (221, 12303), (223, 12330), (241, 12480), (250, 12540), (252, 12552), (254, 12582), (261, 12627), (270, 12690), (280, 12753), (282, 12768), (285, 12786), (288, 12795), (316, 12909), (317, 12912), (322, 12936), (331, 12972), (332, 12978), (340, 13011), (348, 13044), (358, 13101), (389, 13215), (395, 13305), (398, 13329), (400, 13341), (403, 13377), (417, 13512), (433, 13602), (435, 13620), (442, 13710), (443, 13713), (448, 13749), (458, 13824), (465, 13866), (469, 13914), (477, 14022), (478, 14025), (494, 14187), (497, 14208), (502, 14268), (511, 14316), (522, 14394), (523, 14397), (524, 14406), (525, 14415), (526, 14418),