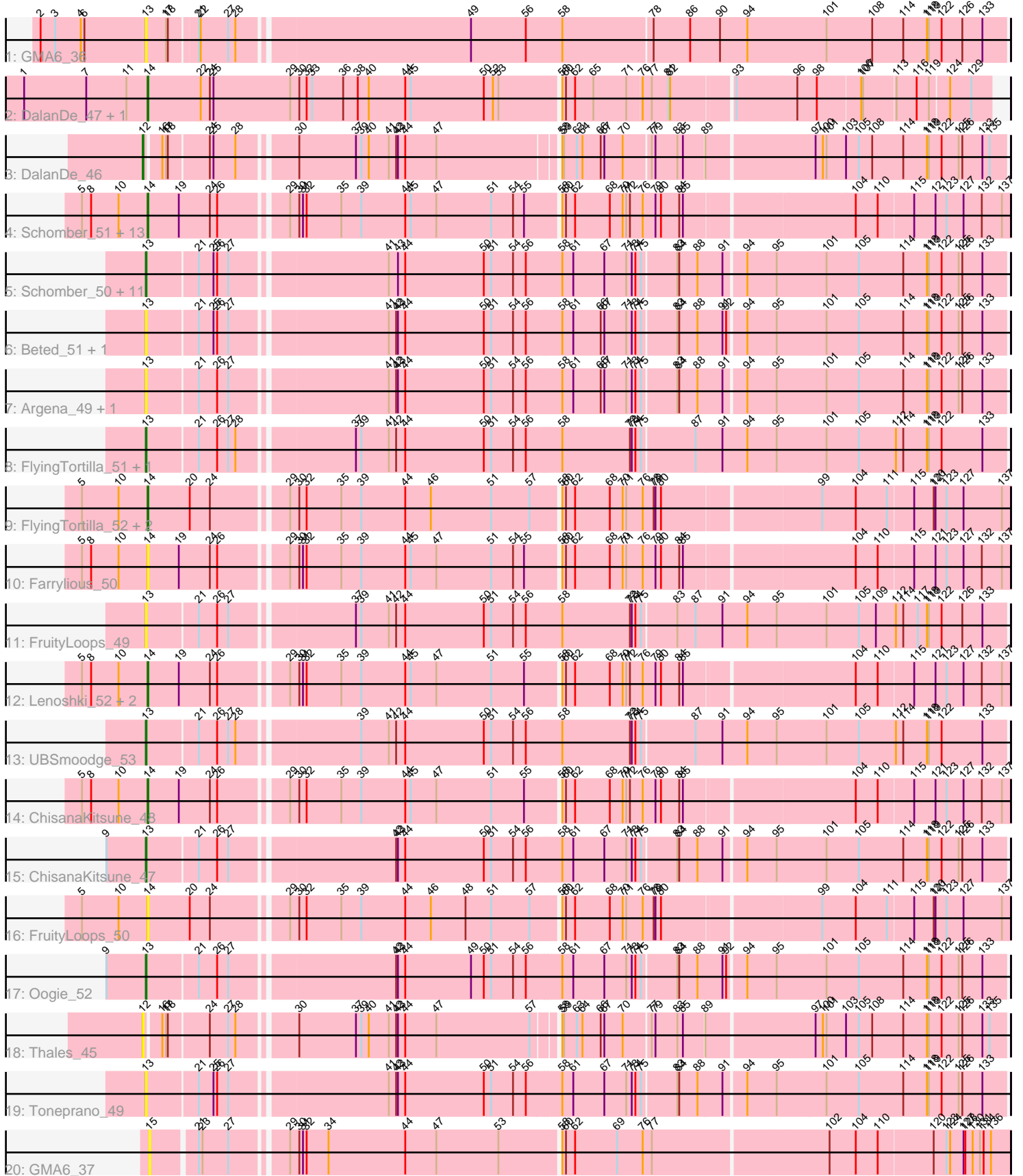


Pham 311677



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 311677 Report

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

Pham number 311677 has 52 members, 28 are drafts.

Phages represented in each track:

- Track 1 : GMA6\_36
- Track 2 : DalanDe\_47, Thales\_46
- Track 3 : DalanDe\_46
- Track 4 : Schomber\_51, Hanem\_52, Alok\_52, Kabocha\_53, Pakusa\_50, Argena\_50, Gray\_52, Twin\_50, MintFritos\_50, EmoNemo\_50, Chidiebere\_52, Toneprano\_50, Mikronejon\_50, Amoonguss\_50
- Track 5 : Schomber\_50, Hanem\_51, Kabocha\_52, Alok\_51, Mikronejon\_49, Amoonguss\_49, Chidiebere\_51, Gray\_51, Twin\_49, Pakusa\_49, EmoNemo\_49, MintFritos\_49
- Track 6 : Beted\_51, Lenoshki\_51
- Track 7 : Argena\_49, Farrylious\_49
- Track 8 : FlyingTortilla\_51, ScarletRaider\_50
- Track 9 : FlyingTortilla\_52, UBSmoodge\_54, ScarletRaider\_51
- Track 10 : Farrylious\_50
- Track 11 : FruityLoops\_49
- Track 12 : Lenoshki\_52, Beted\_52, Oogie\_53
- Track 13 : UBSmoodge\_53
- Track 14 : ChisanaKitsune\_48
- Track 15 : ChisanaKitsune\_47
- Track 16 : FruityLoops\_50
- Track 17 : Oogie\_52
- Track 18 : Thales\_45
- Track 19 : Toneprano\_49
- Track 20 : GMA6\_37

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

The start number called the most often in the published annotations is 14, it was called in 12 of the 24 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Alok\_52, Amoonguss\_50, Argena\_50, Beted\_52, Chidiebere\_52, ChisanaKitsune\_48, DalanDe\_47, EmoNemo\_50, Farrylious\_50, FlyingTortilla\_52, FruityLoops\_50, Gray\_52, Hanem\_52, Kabocha\_53, Lenoshki\_52, Mikronejon\_50,

MintFritos\_50, Oogie\_53, Pakusa\_50, ScarletRaider\_51, Schomber\_51, Thales\_46, Toneprano\_50, Twin\_50, UBSmoodge\_54,

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

- 

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

- Aloki\_51, Amoonguss\_49, Argena\_49, Beted\_51, Chidiebere\_51, ChisanaKitsune\_47, DalanDe\_46, EmoNemo\_49, Farrylious\_49, FlyingTortilla\_51, FruityLoops\_49, GMA6\_36, GMA6\_37, Gray\_51, Hanem\_51, Kabocha\_52, Lenoshki\_51, Mikronejon\_49, MintFritos\_49, Oogie\_52, Pakusa\_49, ScarletRaider\_50, Schomber\_50, Thales\_45, Toneprano\_49, Twin\_49, UBSmoodge\_53,

### Summary by start number:

Start 12:

- Found in 2 of 52 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 1 of 24
- Called 100.0% of time when present
- Phage (with cluster) where this start called: DalanDe\_46 (DQ), Thales\_45 (DQ),

Start 13:

- Found in 24 of 52 ( 46.2% ) of genes in pham
- Manual Annotations of this start: 11 of 24
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aloki\_51 (DQ), Amoonguss\_49 (DQ), Argena\_49 (DQ), Beted\_51 (DQ), Chidiebere\_51 (DQ), ChisanaKitsune\_47 (DQ), EmoNemo\_49 (DQ), Farrylious\_49 (DQ), FlyingTortilla\_51 (DQ), FruityLoops\_49 (DQ), GMA6\_36 (DQ), Gray\_51 (DQ), Hanem\_51 (DQ), Kabocha\_52 (DQ), Lenoshki\_51 (DQ), Mikronejon\_49 (DQ), MintFritos\_49 (DQ), Oogie\_52 (DQ), Pakusa\_49 (DQ), ScarletRaider\_50 (DQ), Schomber\_50 (DQ), Toneprano\_49 (DQ), Twin\_49 (DQ), UBSmoodge\_53 (DQ),

Start 14:

- Found in 25 of 52 ( 48.1% ) of genes in pham
- Manual Annotations of this start: 12 of 24
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Aloki\_52 (DQ), Amoonguss\_50 (DQ), Argena\_50 (DQ), Beted\_52 (DQ), Chidiebere\_52 (DQ), ChisanaKitsune\_48 (DQ), DalanDe\_47 (DQ), EmoNemo\_50 (DQ), Farrylious\_50 (DQ), FlyingTortilla\_52 (DQ), FruityLoops\_50 (DQ), Gray\_52 (DQ), Hanem\_52 (DQ), Kabocha\_53 (DQ), Lenoshki\_52 (DQ), Mikronejon\_50 (DQ), MintFritos\_50 (DQ), Oogie\_53 (DQ), Pakusa\_50 (DQ), ScarletRaider\_51 (DQ), Schomber\_51 (DQ), Thales\_46 (DQ), Toneprano\_50 (DQ), Twin\_50 (DQ), UBSmoodge\_54 (DQ),

Start 15:

- Found in 1 of 52 ( 1.9% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: GMA6\_37 (DQ),

### Summary by clusters:

There is one cluster represented in this pham: DQ

Info for manual annotations of cluster DQ:

- Start number 12 was manually annotated 1 time for cluster DQ.
- Start number 13 was manually annotated 11 times for cluster DQ.
- Start number 14 was manually annotated 12 times for cluster DQ.

### **Gene Information:**

Gene: Aloki\_51 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Aloki\_51:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Aloki\_52 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Aloki\_52:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Amoonguss\_49 Start: 38205, Stop: 39563, Start Num: 13

Candidate Starts for Amoonguss\_49:

(Start: 13 @38205 has 11 MA's), (21, 38286), (25, 38310), (26, 38316), (27, 38334), (41, 38574), (43, 38589), (44, 38601), (50, 38730), (51, 38742), (54, 38778), (56, 38799), (58, 38856), (61, 38874), (67, 38925), (71, 38961), (73, 38970), (74, 38976), (75, 38985), (83, 39039), (84, 39042), (88, 39072), (91, 39111), (94, 39144), (95, 39192), (101, 39273), (105, 39324), (114, 39396), (118, 39435), (119, 39438), (122, 39459), (125, 39486), (126, 39492), (133, 39525),

Gene: Amoonguss\_50 Start: 39574, Stop: 40926, Start Num: 14

Candidate Starts for Amoonguss\_50:

(5, 39469), (8, 39484), (10, 39529), (Start: 14 @39574 has 12 MA's), (19, 39625), (24, 39676), (26, 39688), (29, 39787), (30, 39802), (31, 39808), (32, 39814), (35, 39871), (39, 39904), (44, 39976), (45, 39985), (47, 40027), (51, 40117), (54, 40153), (55, 40171), (58, 40222), (60, 40228), (62, 40243), (68, 40300), (70, 40321), (71, 40327), (72, 40333), (76, 40354), (79, 40375), (80, 40384), (84, 40414), (85, 40420), (104, 40681), (110, 40717), (115, 40771), (121, 40804), (123, 40822), (127, 40849), (132, 40879), (137, 40912),

Gene: Argena\_49 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Argena\_49:

(Start: 13 @38202 has 11 MA's), (21, 38283), (26, 38313), (27, 38331), (41, 38571), (42, 38583), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (66, 38916), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Argena\_50 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Argena\_50:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Beted\_51 Start: 39882, Stop: 41240, Start Num: 13

Candidate Starts for Beted\_51:

(Start: 13 @39882 has 11 MA's), (21, 39963), (25, 39987), (26, 39993), (27, 40011), (41, 40251), (42, 40263), (43, 40266), (44, 40278), (50, 40407), (51, 40419), (54, 40455), (56, 40476), (58, 40533), (61, 40551), (66, 40596), (67, 40602), (71, 40638), (73, 40647), (74, 40653), (75, 40662), (83, 40716), (84, 40719), (88, 40749), (91, 40788), (92, 40794), (94, 40821), (95, 40869), (101, 40950), (105, 41001), (114, 41073), (118, 41112), (119, 41115), (122, 41136), (125, 41163), (126, 41169), (133, 41202),

Gene: Beted\_52 Start: 41251, Stop: 42603, Start Num: 14

Candidate Starts for Beted\_52:

(5, 41146), (8, 41161), (10, 41206), (Start: 14 @41251 has 12 MA's), (19, 41302), (24, 41353), (26, 41365), (29, 41464), (30, 41479), (31, 41485), (32, 41491), (35, 41548), (39, 41581), (44, 41653), (45, 41662), (47, 41704), (51, 41794), (55, 41848), (58, 41899), (60, 41905), (62, 41920), (68, 41977), (70, 41998), (71, 42004), (72, 42010), (76, 42031), (79, 42052), (80, 42061), (84, 42091), (85, 42097), (104, 42358), (110, 42394), (115, 42448), (121, 42481), (123, 42499), (127, 42526), (132, 42556), (137, 42589),

Gene: Chidiebere\_51 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Chidiebere\_51:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Chidiebere\_52 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Chidiebere\_52:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: ChisanaKitsune\_48 Start: 38362, Stop: 39714, Start Num: 14

Candidate Starts for ChisanaKitsune\_48:

(5, 38257), (8, 38272), (10, 38317), (Start: 14 @38362 has 12 MA's), (19, 38413), (24, 38464), (26, 38476), (29, 38575), (30, 38590), (32, 38602), (35, 38659), (39, 38692), (44, 38764), (45, 38773), (47, 38815), (51, 38905), (55, 38959), (58, 39010), (60, 39016), (62, 39031), (68, 39088), (70, 39109), (71, 39115), (72, 39121), (76, 39142), (79, 39163), (80, 39172), (84, 39202), (85, 39208), (104, 39469), (110, 39505), (115, 39559), (121, 39592), (123, 39610), (127, 39637), (132, 39667), (137, 39700),

Gene: ChisanaKitsune\_47 Start: 36993, Stop: 38351, Start Num: 13

Candidate Starts for ChisanaKitsune\_47:

(9, 36930), (Start: 13 @36993 has 11 MA's), (21, 37074), (26, 37104), (27, 37122), (42, 37374), (43, 37377), (44, 37389), (50, 37518), (51, 37530), (54, 37566), (56, 37587), (58, 37644), (61, 37662), (67, 37713), (71, 37749), (73, 37758), (74, 37764), (75, 37773), (83, 37827), (84, 37830), (88, 37860), (91, 37899), (94, 37932), (95, 37980), (101, 38061), (105, 38112), (114, 38184), (118, 38223), (119, 38226), (122, 38247), (125, 38274), (126, 38280), (133, 38313),

Gene: DalanDe\_47 Start: 42585, Stop: 43910, Start Num: 14

Candidate Starts for DalanDe\_47:

(1, 42384), (7, 42486), (11, 42552), (Start: 14 @42585 has 12 MA's), (22, 42672), (24, 42687), (25, 42693), (29, 42819), (30, 42834), (32, 42846), (33, 42855), (36, 42906), (38, 42930), (40, 42948), (44, 43008), (45, 43017), (50, 43137), (52, 43152), (53, 43161), (58, 43254), (60, 43260), (62, 43275), (65, 43305), (71, 43359), (76, 43383), (77, 43398), (81, 43425), (82, 43428), (93, 43521), (96, 43614), (98, 43644), (106, 43713), (107, 43716), (113, 43764), (116, 43797), (119, 43815), (124, 43845), (129, 43878),

Gene: DalanDe\_46 Start: 41242, Stop: 42573, Start Num: 12

Candidate Starts for DalanDe\_46:

(Start: 12 @41242 has 1 MA's), (16, 41266), (17, 41272), (18, 41275), (24, 41338), (25, 41344), (28, 41380), (30, 41461), (37, 41554), (39, 41563), (40, 41575), (41, 41608), (42, 41620), (43, 41623), (44, 41635), (47, 41686), (58, 41869), (59, 41872), (63, 41893), (64, 41902), (66, 41932), (67, 41938), (70, 41968), (77, 42010), (79, 42016), (83, 42052), (85, 42061), (89, 42094), (97, 42265), (100, 42277), (101, 42283), (103, 42313), (105, 42334), (108, 42355), (114, 42406), (118, 42445), (119, 42448), (122, 42469), (125, 42496), (126, 42502), (133, 42535), (135, 42547),

Gene: EmoNemo\_49 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for EmoNemo\_49:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: EmoNemo\_50 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for EmoNemo\_50:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Farrylious\_50 Start: 39347, Stop: 40699, Start Num: 14

Candidate Starts for Farrylious\_50:

(5, 39242), (8, 39257), (10, 39302), (Start: 14 @39347 has 12 MA's), (19, 39398), (24, 39449), (26, 39461), (29, 39560), (30, 39575), (31, 39581), (32, 39587), (35, 39644), (39, 39677), (44, 39749), (45, 39758), (47, 39800), (51, 39890), (54, 39926), (55, 39944), (58, 39995), (60, 40001), (62, 40016), (68, 40073), (70, 40094), (71, 40100), (76, 40127), (79, 40148), (80, 40157), (84, 40187), (85, 40193), (104, 40454), (110, 40490), (115, 40544), (121, 40577), (123, 40595), (127, 40622), (132, 40652), (137, 40685),

Gene: Farrylious\_49 Start: 37978, Stop: 39336, Start Num: 13

Candidate Starts for Farrylious\_49:

(Start: 13 @37978 has 11 MA's), (21, 38059), (26, 38089), (27, 38107), (41, 38347), (42, 38359), (43, 38362), (44, 38374), (50, 38503), (51, 38515), (54, 38551), (56, 38572), (58, 38629), (61, 38647), (66, 38692), (67, 38698), (71, 38734), (73, 38743), (74, 38749), (75, 38758), (83, 38812), (84, 38815), (88, 38845), (91, 38884), (94, 38917), (95, 38965), (101, 39046), (105, 39097), (114, 39169), (118, 39208), (119, 39211), (122, 39232), (125, 39259), (126, 39265), (133, 39298),

Gene: FlyingTortilla\_51 Start: 41776, Stop: 43140, Start Num: 13

Candidate Starts for FlyingTortilla\_51:

(Start: 13 @41776 has 11 MA's), (21, 41857), (26, 41887), (27, 41905), (28, 41917), (37, 42091), (39, 42100), (41, 42145), (42, 42157), (44, 42172), (50, 42301), (51, 42313), (54, 42349), (56, 42370), (58, 42427), (72, 42538), (73, 42541), (74, 42547), (75, 42556), (87, 42640), (91, 42682), (94, 42721), (95, 42769), (101, 42850), (105, 42901), (112, 42961), (114, 42973), (118, 43012), (119, 43015), (122, 43036), (133, 43102),

Gene: FlyingTortilla\_52 Start: 43151, Stop: 44503, Start Num: 14

Candidate Starts for FlyingTortilla\_52:

(5, 43046), (10, 43106), (Start: 14 @43151 has 12 MA's), (20, 43220), (24, 43253), (29, 43364), (30, 43379), (32, 43391), (35, 43448), (39, 43481), (44, 43553), (46, 43595), (51, 43694), (57, 43757), (58, 43799), (60, 43805), (62, 43820), (68, 43877), (70, 43898), (71, 43904), (76, 43931), (78, 43949), (79, 43952), (80, 43961), (99, 44204), (104, 44258), (111, 44309), (115, 44348), (120, 44378), (121, 44381), (123, 44399), (127, 44426), (137, 44489),

Gene: FruityLoops\_49 Start: 41076, Stop: 42440, Start Num: 13

Candidate Starts for FruityLoops\_49:

(Start: 13 @41076 has 11 MA's), (21, 41157), (26, 41187), (27, 41205), (37, 41391), (39, 41400), (41, 41445), (42, 41457), (44, 41472), (50, 41601), (51, 41613), (54, 41649), (56, 41670), (58, 41727), (72, 41838), (73, 41841), (74, 41847), (75, 41856), (83, 41910), (87, 41940), (91, 41982), (94, 42021), (95, 42069), (101, 42150), (105, 42201), (109, 42228), (112, 42261), (114, 42273), (117, 42297), (118, 42312), (119, 42315), (122, 42336), (126, 42369), (133, 42402),

Gene: FruityLoops\_50 Start: 42451, Stop: 43803, Start Num: 14

Candidate Starts for FruityLoops\_50:

(5, 42346), (10, 42406), (Start: 14 @42451 has 12 MA's), (20, 42520), (24, 42553), (29, 42664), (30, 42679), (32, 42691), (35, 42748), (39, 42781), (44, 42853), (46, 42895), (48, 42952), (51, 42994), (57, 43057), (58, 43099), (60, 43105), (62, 43120), (68, 43177), (70, 43198), (71, 43204), (76, 43231), (78, 43249), (79, 43252), (80, 43261), (99, 43504), (104, 43558), (111, 43609), (115, 43648), (120, 43678), (121, 43681), (123, 43699), (127, 43726), (137, 43789),

Gene: GMA6\_36 Start: 29518, Stop: 30879, Start Num: 13

Candidate Starts for GMA6\_36:

(2, 29350), (3, 29374), (4, 29416), (6, 29422), (Start: 13 @29518 has 11 MA's), (17, 29548), (18, 29551), (21, 29593), (22, 29596), (27, 29641), (28, 29653), (49, 30016), (56, 30106), (58, 30163), (78, 30307), (86, 30367), (90, 30415), (94, 30460), (101, 30589), (108, 30661), (114, 30712), (118, 30751), (119, 30754), (122, 30775), (126, 30808), (133, 30841),

Gene: GMA6\_37 Start: 30895, Stop: 32241, Start Num: 15

Candidate Starts for GMA6\_37:

(15, 30895), (21, 30964), (23, 30970), (27, 31012), (29, 31093), (30, 31108), (31, 31114), (32, 31120), (34, 31156), (44, 31282), (47, 31333), (53, 31435), (58, 31528), (60, 31534), (62, 31549), (69, 31618), (76, 31660), (77, 31675), (102, 31954), (104, 31996), (110, 32032), (120, 32116), (123, 32137), (124, 32143), (127, 32164), (128, 32167), (130, 32179), (131, 32191), (134, 32197), (136, 32209),

Gene: Gray\_52 Start: 39572, Stop: 40924, Start Num: 14

Candidate Starts for Gray\_52:

(5, 39467), (8, 39482), (10, 39527), (Start: 14 @39572 has 12 MA's), (19, 39623), (24, 39674), (26, 39686), (29, 39785), (30, 39800), (31, 39806), (32, 39812), (35, 39869), (39, 39902), (44, 39974), (45, 39983), (47, 40025), (51, 40115), (54, 40151), (55, 40169), (58, 40220), (60, 40226), (62, 40241), (68, 40298), (70, 40319), (71, 40325), (72, 40331), (76, 40352), (79, 40373), (80, 40382), (84, 40412), (85, 40418), (104, 40679), (110, 40715), (115, 40769), (121, 40802), (123, 40820), (127, 40847), (132, 40877), (137, 40910),

Gene: Gray\_51 Start: 38203, Stop: 39561, Start Num: 13

Candidate Starts for Gray\_51:

(Start: 13 @38203 has 11 MA's), (21, 38284), (25, 38308), (26, 38314), (27, 38332), (41, 38572), (43, 38587), (44, 38599), (50, 38728), (51, 38740), (54, 38776), (56, 38797), (58, 38854), (61, 38872), (67, 38923), (71, 38959), (73, 38968), (74, 38974), (75, 38983), (83, 39037), (84, 39040), (88, 39070), (91, 39109), (94, 39142), (95, 39190), (101, 39271), (105, 39322), (114, 39394), (118, 39433), (119, 39436), (122, 39457), (125, 39484), (126, 39490), (133, 39523),

Gene: Hanem\_52 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Hanem\_52:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Hanem\_51 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Hanem\_51:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Kabocha\_52 Start: 39015, Stop: 40373, Start Num: 13

Candidate Starts for Kabocha\_52:

(Start: 13 @39015 has 11 MA's), (21, 39096), (25, 39120), (26, 39126), (27, 39144), (41, 39384), (43, 39399), (44, 39411), (50, 39540), (51, 39552), (54, 39588), (56, 39609), (58, 39666), (61, 39684), (67, 39735), (71, 39771), (73, 39780), (74, 39786), (75, 39795), (83, 39849), (84, 39852), (88, 39882), (91, 39921), (94, 39954), (95, 40002), (101, 40083), (105, 40134), (114, 40206), (118, 40245), (119, 40248), (122, 40269), (125, 40296), (126, 40302), (133, 40335),

Gene: Kabocha\_53 Start: 40384, Stop: 41736, Start Num: 14

Candidate Starts for Kabocha\_53:

(5, 40279), (8, 40294), (10, 40339), (Start: 14 @40384 has 12 MA's), (19, 40435), (24, 40486), (26, 40498), (29, 40597), (30, 40612), (31, 40618), (32, 40624), (35, 40681), (39, 40714), (44, 40786), (45, 40795), (47, 40837), (51, 40927), (54, 40963), (55, 40981), (58, 41032), (60, 41038), (62, 41053), (68, 41110), (70, 41131), (71, 41137), (72, 41143), (76, 41164), (79, 41185), (80, 41194), (84, 41224), (85, 41230), (104, 41491), (110, 41527), (115, 41581), (121, 41614), (123, 41632), (127, 41659), (132, 41689), (137, 41722),

Gene: Lenoshki\_52 Start: 41251, Stop: 42603, Start Num: 14

Candidate Starts for Lenoshki\_52:

(5, 41146), (8, 41161), (10, 41206), (Start: 14 @41251 has 12 MA's), (19, 41302), (24, 41353), (26, 41365), (29, 41464), (30, 41479), (31, 41485), (32, 41491), (35, 41548), (39, 41581), (44, 41653), (45, 41662), (47, 41704), (51, 41794), (55, 41848), (58, 41899), (60, 41905), (62, 41920), (68, 41977), (70, 41998), (71, 42004), (72, 42010), (76, 42031), (79, 42052), (80, 42061), (84, 42091), (85, 42097), (104, 42358), (110, 42394), (115, 42448), (121, 42481), (123, 42499), (127, 42526), (132, 42556), (137, 42589),

Gene: Lenoshki\_51 Start: 39882, Stop: 41240, Start Num: 13

Candidate Starts for Lenoshki\_51:

(Start: 13 @39882 has 11 MA's), (21, 39963), (25, 39987), (26, 39993), (27, 40011), (41, 40251), (42, 40263), (43, 40266), (44, 40278), (50, 40407), (51, 40419), (54, 40455), (56, 40476), (58, 40533), (61, 40551), (66, 40596), (67, 40602), (71, 40638), (73, 40647), (74, 40653), (75, 40662), (83, 40716), (84, 40719), (88, 40749), (91, 40788), (92, 40794), (94, 40821), (95, 40869), (101, 40950), (105, 41001), (114, 41073), (118, 41112), (119, 41115), (122, 41136), (125, 41163), (126, 41169), (133, 41202),

Gene: Mikronejon\_49 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Mikronejon\_49:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Mikronejon\_50 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Mikronejon\_50:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: MintFritos\_50 Start: 39572, Stop: 40924, Start Num: 14

Candidate Starts for MintFritos\_50:

(5, 39467), (8, 39482), (10, 39527), (Start: 14 @39572 has 12 MA's), (19, 39623), (24, 39674), (26, 39686), (29, 39785), (30, 39800), (31, 39806), (32, 39812), (35, 39869), (39, 39902), (44, 39974), (45, 39983), (47, 40025), (51, 40115), (54, 40151), (55, 40169), (58, 40220), (60, 40226), (62, 40241), (68, 40298), (70, 40319), (71, 40325), (72, 40331), (76, 40352), (79, 40373), (80, 40382), (84, 40412), (85, 40418), (104, 40679), (110, 40715), (115, 40769), (121, 40802), (123, 40820), (127, 40847), (132, 40877), (137, 40910),

Gene: MintFritos\_49 Start: 38203, Stop: 39561, Start Num: 13

Candidate Starts for MintFritos\_49:

(Start: 13 @38203 has 11 MA's), (21, 38284), (25, 38308), (26, 38314), (27, 38332), (41, 38572), (43, 38587), (44, 38599), (50, 38728), (51, 38740), (54, 38776), (56, 38797), (58, 38854), (61, 38872), (67, 38923), (71, 38959), (73, 38968), (74, 38974), (75, 38983), (83, 39037), (84, 39040), (88, 39070), (91, 39109), (94, 39142), (95, 39190), (101, 39271), (105, 39322), (114, 39394), (118, 39433), (119, 39436), (122, 39457), (125, 39484), (126, 39490), (133, 39523),

Gene: Oogie\_52 Start: 39908, Stop: 41266, Start Num: 13

Candidate Starts for Oogie\_52:

(9, 39845), (Start: 13 @39908 has 11 MA's), (21, 39989), (26, 40019), (27, 40037), (42, 40289), (43, 40292), (44, 40304), (49, 40412), (50, 40433), (51, 40445), (54, 40481), (56, 40502), (58, 40559), (61,

40577), (67, 40628), (71, 40664), (73, 40673), (74, 40679), (75, 40688), (83, 40742), (84, 40745), (88, 40775), (91, 40814), (92, 40820), (94, 40847), (95, 40895), (101, 40976), (105, 41027), (114, 41099), (118, 41138), (119, 41141), (122, 41162), (125, 41189), (126, 41195), (133, 41228),

Gene: Oogie\_53 Start: 41277, Stop: 42629, Start Num: 14

Candidate Starts for Oogie\_53:

(5, 41172), (8, 41187), (10, 41232), (Start: 14 @41277 has 12 MA's), (19, 41328), (24, 41379), (26, 41391), (29, 41490), (30, 41505), (31, 41511), (32, 41517), (35, 41574), (39, 41607), (44, 41679), (45, 41688), (47, 41730), (51, 41820), (55, 41874), (58, 41925), (60, 41931), (62, 41946), (68, 42003), (70, 42024), (71, 42030), (72, 42036), (76, 42057), (79, 42078), (80, 42087), (84, 42117), (85, 42123), (104, 42384), (110, 42420), (115, 42474), (121, 42507), (123, 42525), (127, 42552), (132, 42582), (137, 42615),

Gene: Pakusa\_50 Start: 39313, Stop: 40665, Start Num: 14

Candidate Starts for Pakusa\_50:

(5, 39208), (8, 39223), (10, 39268), (Start: 14 @39313 has 12 MA's), (19, 39364), (24, 39415), (26, 39427), (29, 39526), (30, 39541), (31, 39547), (32, 39553), (35, 39610), (39, 39643), (44, 39715), (45, 39724), (47, 39766), (51, 39856), (54, 39892), (55, 39910), (58, 39961), (60, 39967), (62, 39982), (68, 40039), (70, 40060), (71, 40066), (72, 40072), (76, 40093), (79, 40114), (80, 40123), (84, 40153), (85, 40159), (104, 40420), (110, 40456), (115, 40510), (121, 40543), (123, 40561), (127, 40588), (132, 40618), (137, 40651),

Gene: Pakusa\_49 Start: 37944, Stop: 39302, Start Num: 13

Candidate Starts for Pakusa\_49:

(Start: 13 @37944 has 11 MA's), (21, 38025), (25, 38049), (26, 38055), (27, 38073), (41, 38313), (43, 38328), (44, 38340), (50, 38469), (51, 38481), (54, 38517), (56, 38538), (58, 38595), (61, 38613), (67, 38664), (71, 38700), (73, 38709), (74, 38715), (75, 38724), (83, 38778), (84, 38781), (88, 38811), (91, 38850), (94, 38883), (95, 38931), (101, 39012), (105, 39063), (114, 39135), (118, 39174), (119, 39177), (122, 39198), (125, 39225), (126, 39231), (133, 39264),

Gene: ScarletRaider\_50 Start: 41084, Stop: 42448, Start Num: 13

Candidate Starts for ScarletRaider\_50:

(Start: 13 @41084 has 11 MA's), (21, 41165), (26, 41195), (27, 41213), (28, 41225), (37, 41399), (39, 41408), (41, 41453), (42, 41465), (44, 41480), (50, 41609), (51, 41621), (54, 41657), (56, 41678), (58, 41735), (72, 41846), (73, 41849), (74, 41855), (75, 41864), (87, 41948), (91, 41990), (94, 42029), (95, 42077), (101, 42158), (105, 42209), (112, 42269), (114, 42281), (118, 42320), (119, 42323), (122, 42344), (133, 42410),

Gene: ScarletRaider\_51 Start: 42459, Stop: 43811, Start Num: 14

Candidate Starts for ScarletRaider\_51:

(5, 42354), (10, 42414), (Start: 14 @42459 has 12 MA's), (20, 42528), (24, 42561), (29, 42672), (30, 42687), (32, 42699), (35, 42756), (39, 42789), (44, 42861), (46, 42903), (51, 43002), (57, 43065), (58, 43107), (60, 43113), (62, 43128), (68, 43185), (70, 43206), (71, 43212), (76, 43239), (78, 43257), (79, 43260), (80, 43269), (99, 43512), (104, 43566), (111, 43617), (115, 43656), (120, 43686), (121, 43689), (123, 43707), (127, 43734), (137, 43797),

Gene: Schomber\_51 Start: 39321, Stop: 40673, Start Num: 14

Candidate Starts for Schomber\_51:

(5, 39216), (8, 39231), (10, 39276), (Start: 14 @39321 has 12 MA's), (19, 39372), (24, 39423), (26, 39435), (29, 39534), (30, 39549), (31, 39555), (32, 39561), (35, 39618), (39, 39651), (44, 39723), (45, 39732), (47, 39774), (51, 39864), (54, 39900), (55, 39918), (58, 39969), (60, 39975), (62, 39990), (68, 40047), (70, 40068), (71, 40074), (72, 40080), (76, 40101), (79, 40122), (80, 40131), (84, 40161), (85, 40167), (104, 40428), (110, 40464), (115, 40518), (121, 40551), (123, 40569), (127, 40596), (132,

40626), (137, 40659),

Gene: Schomber\_50 Start: 37952, Stop: 39310, Start Num: 13

Candidate Starts for Schomber\_50:

(Start: 13 @37952 has 11 MA's), (21, 38033), (25, 38057), (26, 38063), (27, 38081), (41, 38321), (43, 38336), (44, 38348), (50, 38477), (51, 38489), (54, 38525), (56, 38546), (58, 38603), (61, 38621), (67, 38672), (71, 38708), (73, 38717), (74, 38723), (75, 38732), (83, 38786), (84, 38789), (88, 38819), (91, 38858), (94, 38891), (95, 38939), (101, 39020), (105, 39071), (114, 39143), (118, 39182), (119, 39185), (122, 39206), (125, 39233), (126, 39239), (133, 39272),

Gene: Thales\_45 Start: 40158, Stop: 41489, Start Num: 12

Candidate Starts for Thales\_45:

(Start: 12 @40158 has 1 MA's), (16, 40182), (17, 40188), (18, 40191), (24, 40254), (27, 40284), (28, 40296), (30, 40377), (37, 40470), (39, 40479), (40, 40491), (41, 40524), (42, 40536), (43, 40539), (44, 40551), (47, 40602), (57, 40752), (58, 40785), (59, 40788), (63, 40809), (64, 40818), (66, 40848), (67, 40854), (70, 40884), (77, 40926), (79, 40932), (83, 40968), (85, 40977), (89, 41010), (97, 41181), (100, 41193), (101, 41199), (103, 41229), (105, 41250), (108, 41271), (114, 41322), (118, 41361), (119, 41364), (122, 41385), (125, 41412), (126, 41418), (133, 41451), (135, 41463),

Gene: Thales\_46 Start: 41501, Stop: 42826, Start Num: 14

Candidate Starts for Thales\_46:

(1, 41300), (7, 41402), (11, 41468), (Start: 14 @41501 has 12 MA's), (22, 41588), (24, 41603), (25, 41609), (29, 41735), (30, 41750), (32, 41762), (33, 41771), (36, 41822), (38, 41846), (40, 41864), (44, 41924), (45, 41933), (50, 42053), (52, 42068), (53, 42077), (58, 42170), (60, 42176), (62, 42191), (65, 42221), (71, 42275), (76, 42299), (77, 42314), (81, 42341), (82, 42344), (93, 42437), (96, 42530), (98, 42560), (106, 42629), (107, 42632), (113, 42680), (116, 42713), (119, 42731), (124, 42761), (129, 42794),

Gene: Toneprano\_49 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Toneprano\_49:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (42, 38583), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: Toneprano\_50 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Toneprano\_50:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Twin\_50 Start: 39571, Stop: 40923, Start Num: 14

Candidate Starts for Twin\_50:

(5, 39466), (8, 39481), (10, 39526), (Start: 14 @39571 has 12 MA's), (19, 39622), (24, 39673), (26, 39685), (29, 39784), (30, 39799), (31, 39805), (32, 39811), (35, 39868), (39, 39901), (44, 39973), (45, 39982), (47, 40024), (51, 40114), (54, 40150), (55, 40168), (58, 40219), (60, 40225), (62, 40240), (68, 40297), (70, 40318), (71, 40324), (72, 40330), (76, 40351), (79, 40372), (80, 40381), (84, 40411), (85, 40417), (104, 40678), (110, 40714), (115, 40768), (121, 40801), (123, 40819), (127, 40846), (132, 40876), (137, 40909),

Gene: Twin\_49 Start: 38202, Stop: 39560, Start Num: 13

Candidate Starts for Twin\_49:

(Start: 13 @38202 has 11 MA's), (21, 38283), (25, 38307), (26, 38313), (27, 38331), (41, 38571), (43, 38586), (44, 38598), (50, 38727), (51, 38739), (54, 38775), (56, 38796), (58, 38853), (61, 38871), (67, 38922), (71, 38958), (73, 38967), (74, 38973), (75, 38982), (83, 39036), (84, 39039), (88, 39069), (91, 39108), (94, 39141), (95, 39189), (101, 39270), (105, 39321), (114, 39393), (118, 39432), (119, 39435), (122, 39456), (125, 39483), (126, 39489), (133, 39522),

Gene: UBSmoodge\_54 Start: 42917, Stop: 44269, Start Num: 14

Candidate Starts for UBSmoodge\_54:

(5, 42812), (10, 42872), (Start: 14 @42917 has 12 MA's), (20, 42986), (24, 43019), (29, 43130), (30, 43145), (32, 43157), (35, 43214), (39, 43247), (44, 43319), (46, 43361), (51, 43460), (57, 43523), (58, 43565), (60, 43571), (62, 43586), (68, 43643), (70, 43664), (71, 43670), (76, 43697), (78, 43715), (79, 43718), (80, 43727), (99, 43970), (104, 44024), (111, 44075), (115, 44114), (120, 44144), (121, 44147), (123, 44165), (127, 44192), (137, 44255),

Gene: UBSmoodge\_53 Start: 41542, Stop: 42906, Start Num: 13

Candidate Starts for UBSmoodge\_53:

(Start: 13 @41542 has 11 MA's), (21, 41623), (26, 41653), (27, 41671), (28, 41683), (39, 41866), (41, 41911), (42, 41923), (44, 41938), (50, 42067), (51, 42079), (54, 42115), (56, 42136), (58, 42193), (72, 42304), (73, 42307), (74, 42313), (75, 42322), (87, 42406), (91, 42448), (94, 42487), (95, 42535), (101, 42616), (105, 42667), (112, 42727), (114, 42739), (118, 42778), (119, 42781), (122, 42802), (133, 42868),