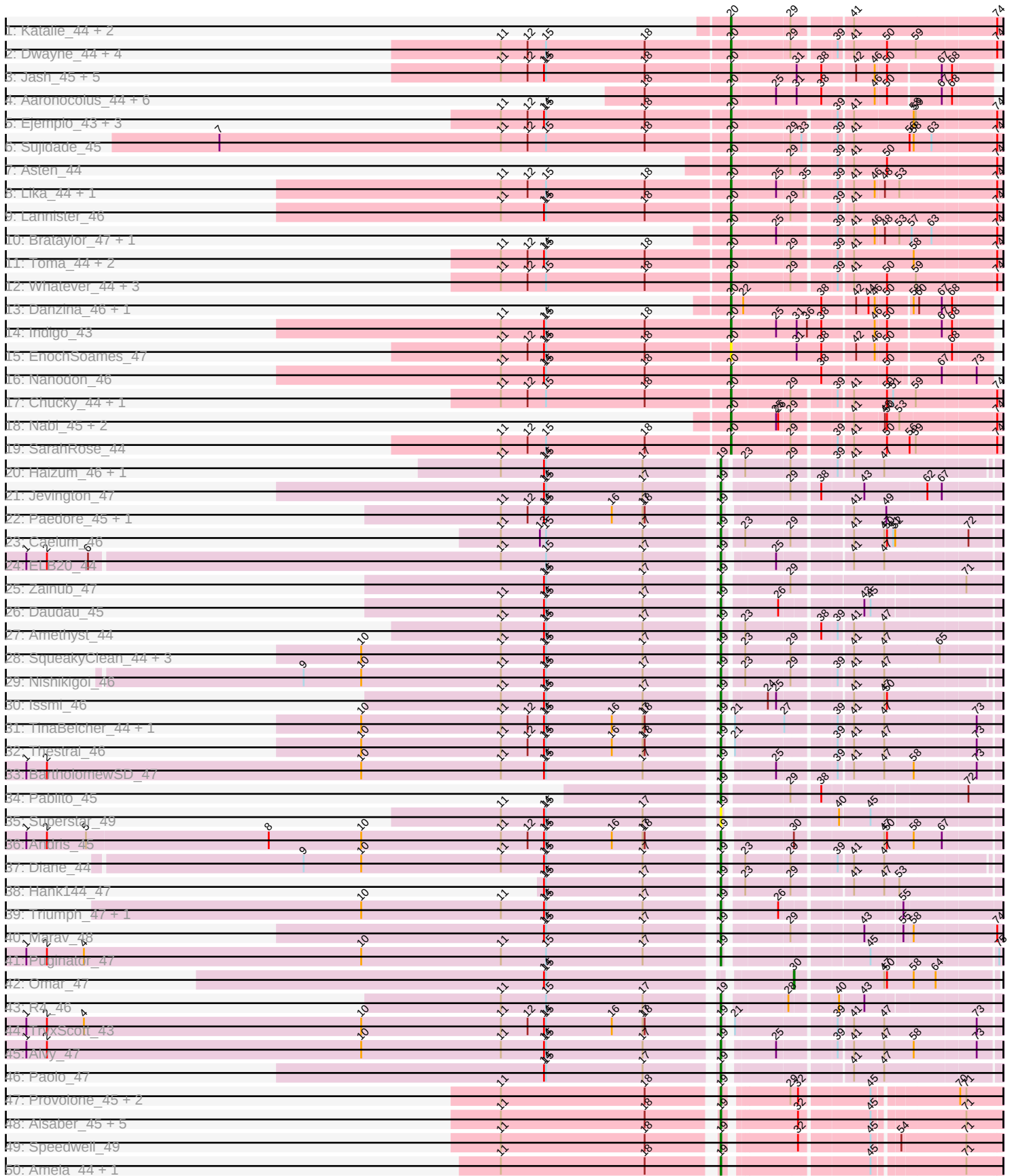
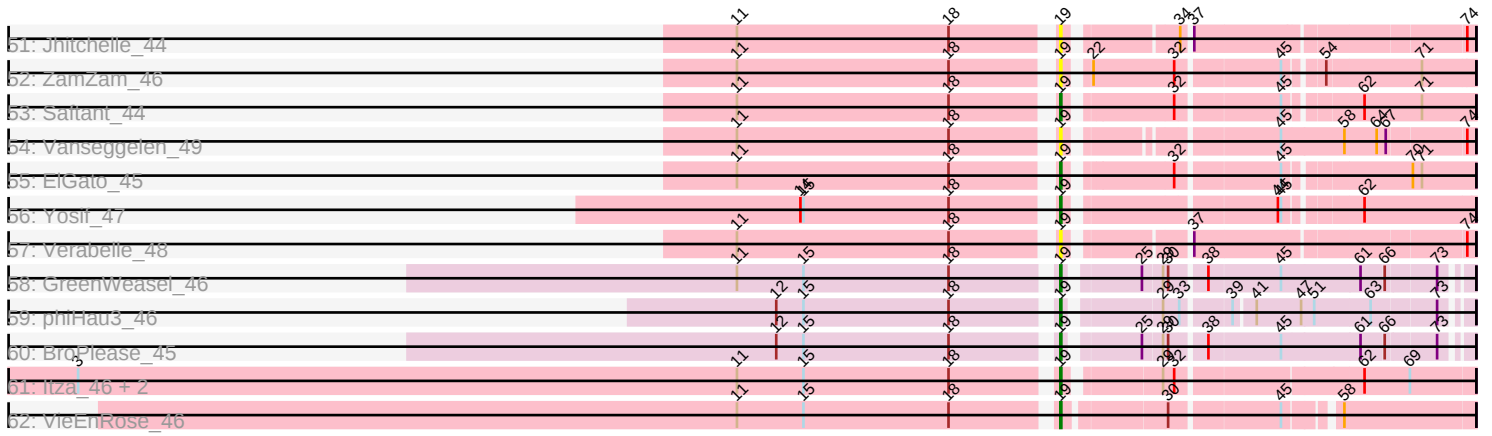






Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly 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 280256 Report

This analysis was run 02/07/26 on database version 634.

WARNING: Pham size does not match number of genes in report. Either unphamerated genes have been added (by you) or starterator has removed genes due to invalid start codon.

Pham number 280256 has 110 members, 9 are drafts.

Phages represented in each track:

- Track 1 : Katalie_44, RedBear_45, South40_44
- Track 2 : Dwayne_44, Emaanora_47, OzzyJ_45, Hippo_44, TagePhighter_46
- Track 3 : Jash_45, Eddasa_45, Oliynyk_45, Izzy_45, BryanRecycles_45, Rusticus_45
- Track 4 : Aaronocolus_44, Unstoppable_44, Esperer_44, Nerdos_43, Phettuccine_44, Bovely_44, Leviticus_44
- Track 5 : Ejemplo_43, Maneekul_44, Yasdnil_44, TuanPN_43
- Track 6 : Sujidade_45
- Track 7 : Asten_44
- Track 8 : Lika_44, Godpower_45
- Track 9 : Lannister_46
- Track 10 : Brataylor_47, Celeste_45
- Track 11 : Toma_44, Dattran_46, Goby_44
- Track 12 : Whatever_44, Triste_44, Werner_44, BarryBee_47
- Track 13 : Danzina_46, Zemlya_46
- Track 14 : Indigo_43
- Track 15 : EnochSoames_47
- Track 16 : Nanodon_46
- Track 17 : Chucky_44, Snorlax_44
- Track 18 : Nabi_45, Rana_45, Lorelei_45
- Track 19 : SarahRose_44
- Track 20 : Haizum_46, Tefunt_46
- Track 21 : Jevington_47
- Track 22 : Paedore_45, Loofah_46
- Track 23 : Caelum_46
- Track 24 : ELB20_44
- Track 25 : Zainub_47
- Track 26 : Daudau_45
- Track 27 : Amethyst_44
- Track 28 : SqueakyClean_44, GirlDinner_44, Animus_44, Janus_45
- Track 29 : Nishikigoi_46
- Track 30 : Issmi_46
- Track 31 : TinaBelcher_44, Bowden_44

- Track 32 : Thestral_46
- Track 33 : BartholomewSD_47
- Track 34 : Pablito_45
- Track 35 : Superstar_49
- Track 36 : Andris_45
- Track 37 : Diane_44
- Track 38 : Hank144_47
- Track 39 : Triumph_47, Axiom_46
- Track 40 : Marav_48
- Track 41 : Puginator_47
- Track 42 : Omar_47
- Track 43 : R4_46
- Track 44 : TrvxScott_43
- Track 45 : Alvy_47
- Track 46 : Paolo_47
- Track 47 : Provolone_45, Pavo_45, Conan_45
- Track 48 : Alsaber_45, phiCAM_42, Sudan_45, Kaine_44, Dexers_43, Celery_47
- Track 49 : Speedwell_49
- Track 50 : Amela_44, Verse_44
- Track 51 : Jhitchelle_44
- Track 52 : ZamZam_46
- Track 53 : Saftant_44
- Track 54 : Vanseggelen_49
- Track 55 : ElGato_45
- Track 56 : Yosif_47
- Track 57 : Verabelle_48
- Track 58 : GreenWeasel_46
- Track 59 : phiHau3_46
- Track 60 : BroPlease_45
- Track 61 : Itza_46, Celia_46, Urza_46
- Track 62 : VieEnRose_46

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

The start number called the most often in the published annotations is 19, it was called in 51 of the 101 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

• Alsaber_45, Alvy_47, Amela_44, Amethyst_44, Andris_45, Animus_44, Axiom_46, BartholomewSD_47, Bowden_44, BroPlease_45, Caelum_46, Celery_47, Celia_46, Conan_45, Daudau_45, Dexers_43, Diane_44, ELB20_44, ElGato_45, GirlDinner_44, GreenWeasel_46, Haizum_46, Hank144_47, Issmi_46, Itza_46, Janus_45, Jevington_47, Jhitchelle_44, Kaine_44, Loofah_46, Marav_48, Nishikigoi_46, Pablito_45, Paedore_45, Paolo_47, Pavo_45, Provolone_45, Puginator_47, R4_46, Saftant_44, Speedwell_49, SqueakyClean_44, Sudan_45, Superstar_49, Tefunt_46, Thestral_46, TinaBelcher_44, Triumph_47, TrvxScott_43, Urza_46, Vanseggelen_49, Verabelle_48, Verse_44, VieEnRose_46, Yosif_47, Zainub_47, ZamZam_46, phiCAM_42, phiHau3_46,

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

•

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

• Aaronocolus_44, Asten_44, BarryBee_47, Bovely_44, Brataylor_47, BryanRecycles_45, Celeste_45, Chucky_44, Danzina_46, Dattran_46, Dwayne_44, Eddasa_45, Ejemplo_43, Emaanora_47, EnochSoames_47, Esperer_44, Goby_44, Godpower_45, Hippo_44, Indigo_43, Izzy_45, Jash_45, Katalie_44, Lannister_46, Leviticus_44, Lika_44, Lorelei_45, Maneekul_44, Nabi_45, Nanodon_46, Nerdos_43, Oliynyk_45, Omar_47, OzzyJ_45, Phettuccine_44, Rana_45, RedBear_45, Rusticus_45, SarahRose_44, Snorlax_44, South40_44, Sujidade_45, TagePhighter_46, Toma_44, Triste_44, TuanPN_43, Unstoppable_44, Werner_44, Whatever_44, Yasdnail_44, Zemlya_46,

Summary by start number:

Start 19:

• Found in 59 of 110 (53.6%) of genes in pham
• Manual Annotations of this start: 51 of 101
• Called 100.0% of time when present
• Phage (with cluster) where this start called: Alsaber_45 (BD3), Alvy_47 (BD2), Amela_44 (BD3), Amethyst_44 (BD2), Andris_45 (BD2), Animus_44 (BD2), Axiom_46 (BD2), BartholomewSD_47 (BD2), Bowden_44 (BD2), BroPlease_45 (BD4), Caelum_46 (BD2), Celery_47 (BD3), Celia_46 (BD6), Conan_45 (BD3), Daudau_45 (BD2), Dexers_43 (BD3), Diane_44 (BD2), ELB20_44 (BD2), ElGato_45 (BD3), GirlDinner_44 (BD2), GreenWeasel_46 (BD4), Haizum_46 (BD2), Hank144_47 (BD2), Issmi_46 (BD2), Itza_46 (BD6), Janus_45 (BD2), Jevington_47 (BD2), Jhitchelle_44 (BD3), Kaine_44 (BD3), Loofah_46 (BD2), Marav_48 (BD2), Nishikigoi_46 (BD2), Pablito_45 (BD2), Paedore_45 (BD2), Paolo_47 (BD2), Pavo_45 (BD3), Provolone_45 (BD3), Puginator_47 (BD2), R4_46 (BD2), Saftant_44 (BD3), Speedwell_49 (BD3), SqueakyClean_44 (BD2), Sudan_45 (BD3), Superstar_49 (BD2), Tefunt_46 (BD2), Thestral_46 (BD2), TinaBelcher_44 (BD2), Triumph_47 (BD2), TrvxScott_43 (BD2), Urza_46 (BD6), Vanseggelen_49 (BD3), Verabelle_48 (BD3), Verse_44 (BD3), VieEnRose_46 (BD6), Yosif_47 (BD3), Zainub_47 (BD2), ZamZam_46 (BD3), phiCAM_42 (BD3), phiHau3_46 (BD4),

Start 20:

• Found in 50 of 110 (45.5%) of genes in pham
• Manual Annotations of this start: 49 of 101
• Called 100.0% of time when present
• Phage (with cluster) where this start called: Aaronocolus_44 (BD1), Asten_44 (BD1), BarryBee_47 (BD1), Bovely_44 (BD1), Brataylor_47 (BD1), BryanRecycles_45 (BD1), Celeste_45 (BD1), Chucky_44 (BD1), Danzina_46 (BD1), Dattran_46 (BD1), Dwayne_44 (BD1), Eddasa_45 (BD1), Ejemplo_43 (BD1), Emaanora_47 (BD1), EnochSoames_47 (BD1), Esperer_44 (BD1), Goby_44 (BD1), Godpower_45 (BD1), Hippo_44 (BD1), Indigo_43 (BD1), Izzy_45 (BD1), Jash_45 (BD1), Katalie_44 (BD1), Lannister_46 (BD1), Leviticus_44 (BD1), Lika_44 (BD1), Lorelei_45 (BD1), Maneekul_44 (BD1), Nabi_45 (BD1), Nanodon_46 (BD1), Nerdos_43 (BD1), Oliynyk_45 (BD1), OzzyJ_45 (BD1), Phettuccine_44 (BD1), Rana_45 (BD1), RedBear_45 (BD1), Rusticus_45 (BD1), SarahRose_44 (BD1), Snorlax_44 (BD1), South40_44 (BD1), Sujidade_45 (BD1), TagePhighter_46 (BD1), Toma_44 (BD1), Triste_44 (BD1), TuanPN_43 (BD1), Unstoppable_44 (BD1), Werner_44 (BD1), Whatever_44 (BD1), Yasdnail_44 (BD1), Zemlya_46 (BD1),

Start 30:

- Found in 5 of 110 (4.5%) of genes in pham
- Manual Annotations of this start: 1 of 101
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Omar_47 (BD2),

Summary by clusters:

There are 5 clusters represented in this pham: BD4, BD6, BD1, BD3, BD2,

Info for manual annotations of cluster BD1:

- Start number 20 was manually annotated 49 times for cluster BD1.

Info for manual annotations of cluster BD2:

- Start number 19 was manually annotated 32 times for cluster BD2.
- Start number 30 was manually annotated 1 time for cluster BD2.

Info for manual annotations of cluster BD3:

- Start number 19 was manually annotated 12 times for cluster BD3.

Info for manual annotations of cluster BD4:

- Start number 19 was manually annotated 3 times for cluster BD4.

Info for manual annotations of cluster BD6:

- Start number 19 was manually annotated 4 times for cluster BD6.

Gene Information:

Gene: Aaronocolus_44 Start: 30436, Stop: 30792, Start Num: 20

Candidate Starts for Aaronocolus_44:

(18, 30310), (Start: 20 @30436 has 49 MA's), (25, 30499), (31, 30529), (38, 30565), (46, 30637), (50, 30652), (67, 30724), (68, 30736),

Gene: Alsaber_45 Start: 32093, Stop: 32449, Start Num: 19

Candidate Starts for Alsaber_45:

(11, 31793), (18, 32003), (Start: 19 @32093 has 51 MA's), (32, 32183), (45, 32276), (71, 32396),

Gene: Alvy_47 Start: 31974, Stop: 32327, Start Num: 19

Candidate Starts for Alvy_47:

(1, 30978), (2, 31008), (10, 31467), (11, 31671), (14, 31734), (15, 31737), (17, 31878), (Start: 19 @31974 has 51 MA's), (25, 32037), (39, 32109), (41, 32127), (47, 32169), (58, 32211), (73, 32295),

Gene: Amela_44 Start: 32894, Stop: 33247, Start Num: 19

Candidate Starts for Amela_44:

(11, 32594), (18, 32804), (Start: 19 @32894 has 51 MA's), (45, 33077), (71, 33197),

Gene: Amethyst_44 Start: 31337, Stop: 31699, Start Num: 19

Candidate Starts for Amethyst_44:

(11, 31034), (14, 31097), (15, 31100), (17, 31241), (Start: 19 @31337 has 51 MA's), (23, 31364), (38, 31460), (39, 31481), (41, 31499), (47, 31541),

Gene: Andris_45 Start: 31599, Stop: 31958, Start Num: 19

Candidate Starts for Andris_45:

(1, 30606), (2, 30636), (5, 30693), (8, 30957), (10, 31092), (11, 31296), (12, 31335), (14, 31359), (15, 31362), (16, 31458), (17, 31503), (18, 31506), (Start: 19 @31599 has 51 MA's), (Start: 30 @31683 has 1 MA's), (47, 31800), (50, 31803), (58, 31842), (67, 31881),

Gene: Animus_44 Start: 31844, Stop: 32206, Start Num: 19

Candidate Starts for Animus_44:

(10, 31337), (11, 31541), (14, 31604), (15, 31607), (17, 31748), (Start: 19 @31844 has 51 MA's), (23, 31871), (29, 31934), (41, 32006), (47, 32048), (65, 32126),

Gene: Asten_44 Start: 30765, Stop: 31124, Start Num: 20

Candidate Starts for Asten_44:

(Start: 20 @30765 has 49 MA's), (29, 30846), (39, 30900), (41, 30918), (50, 30966), (74, 31116),

Gene: Axiom_46 Start: 31799, Stop: 32143, Start Num: 19

Candidate Starts for Axiom_46:

(10, 31292), (11, 31496), (14, 31559), (15, 31562), (17, 31703), (Start: 19 @31799 has 51 MA's), (26, 31865), (55, 32012),

Gene: BarryBee_47 Start: 30775, Stop: 31134, Start Num: 20

Candidate Starts for BarryBee_47:

(11, 30445), (12, 30484), (15, 30511), (18, 30655), (Start: 20 @30775 has 49 MA's), (29, 30856), (39, 30910), (41, 30928), (50, 30976), (59, 31018), (74, 31126),

Gene: BartholomewSD_47 Start: 31973, Stop: 32326, Start Num: 19

Candidate Starts for BartholomewSD_47:

(1, 30977), (2, 31007), (10, 31466), (11, 31670), (14, 31733), (15, 31736), (17, 31877), (Start: 19 @31973 has 51 MA's), (25, 32036), (39, 32108), (41, 32126), (47, 32168), (58, 32210), (73, 32294),

Gene: Bovely_44 Start: 30442, Stop: 30798, Start Num: 20

Candidate Starts for Bovely_44:

(18, 30316), (Start: 20 @30442 has 49 MA's), (25, 30505), (31, 30535), (38, 30571), (46, 30643), (50, 30658), (67, 30730), (68, 30742),

Gene: Bowden_44 Start: 31888, Stop: 32241, Start Num: 19

Candidate Starts for Bowden_44:

(10, 31381), (11, 31585), (12, 31624), (14, 31648), (15, 31651), (16, 31747), (17, 31792), (18, 31795), (Start: 19 @31888 has 51 MA's), (21, 31894), (27, 31960), (39, 32023), (41, 32041), (47, 32083), (73, 32209),

Gene: Brataylor_47 Start: 31748, Stop: 32104, Start Num: 20

Candidate Starts for Brataylor_47:

(Start: 20 @31748 has 49 MA's), (25, 31814), (39, 31886), (41, 31904), (46, 31934), (48, 31946), (53, 31967), (57, 31985), (63, 32009), (74, 32096),

Gene: BroPlease_45 Start: 30896, Stop: 31243, Start Num: 19

Candidate Starts for BroPlease_45:

(12, 30632), (15, 30659), (18, 30803), (Start: 19 @30896 has 51 MA's), (25, 30959), (29, 30977), (Start: 30 @30980 has 1 MA's), (38, 31010), (45, 31079), (61, 31154), (66, 31175), (73, 31220),

Gene: BryanRecycles_45 Start: 30752, Stop: 31108, Start Num: 20

Candidate Starts for BryanRecycles_45:

(11, 30422), (12, 30461), (14, 30485), (15, 30488), (18, 30632), (Start: 20 @30752 has 49 MA's), (31, 30845), (38, 30881), (42, 30926), (46, 30953), (50, 30968), (67, 31040), (68, 31052),

Gene: Caelum_46 Start: 31569, Stop: 31931, Start Num: 19

Candidate Starts for Caelum_46:

(11, 31266), (13, 31323), (15, 31332), (17, 31473), (Start: 19 @31569 has 51 MA's), (23, 31596), (29, 31659), (41, 31731), (47, 31773), (50, 31776), (51, 31785), (52, 31788), (72, 31887),

Gene: Celery_47 Start: 32026, Stop: 32379, Start Num: 19

Candidate Starts for Celery_47:

(11, 31726), (18, 31936), (Start: 19 @32026 has 51 MA's), (32, 32116), (45, 32209), (71, 32329),

Gene: Celeste_45 Start: 31214, Stop: 31570, Start Num: 20

Candidate Starts for Celeste_45:

(Start: 20 @31214 has 49 MA's), (25, 31280), (39, 31352), (41, 31370), (46, 31400), (48, 31412), (53, 31433), (57, 31451), (63, 31475), (74, 31562),

Gene: Celia_46 Start: 31375, Stop: 31740, Start Num: 19

Candidate Starts for Celia_46:

(3, 30418), (11, 31072), (15, 31138), (18, 31282), (Start: 19 @31375 has 51 MA's), (29, 31456), (32, 31465), (62, 31633), (69, 31678),

Gene: Chucky_44 Start: 30779, Stop: 31138, Start Num: 20

Candidate Starts for Chucky_44:

(11, 30449), (12, 30488), (15, 30515), (18, 30659), (Start: 20 @30779 has 49 MA's), (29, 30860), (39, 30914), (41, 30932), (50, 30980), (51, 30989), (59, 31022), (74, 31130),

Gene: Conan_45 Start: 31987, Stop: 32343, Start Num: 19

Candidate Starts for Conan_45:

(11, 31687), (18, 31897), (Start: 19 @31987 has 51 MA's), (29, 32068), (32, 32077), (45, 32170), (70, 32281), (71, 32290),

Gene: Danzina_46 Start: 31515, Stop: 31871, Start Num: 20

Candidate Starts for Danzina_46:

(Start: 20 @31515 has 49 MA's), (22, 31530), (38, 31644), (42, 31689), (44, 31707), (46, 31716), (50, 31731), (58, 31764), (60, 31770), (67, 31803), (68, 31815),

Gene: Dattran_46 Start: 31357, Stop: 31716, Start Num: 20

Candidate Starts for Dattran_46:

(11, 31027), (12, 31066), (14, 31090), (15, 31093), (18, 31237), (Start: 20 @31357 has 49 MA's), (29, 31438), (39, 31492), (41, 31510), (58, 31597), (74, 31708),

Gene: Daudau_45 Start: 31710, Stop: 32051, Start Num: 19

Candidate Starts for Daudau_45:

(11, 31407), (14, 31470), (15, 31473), (17, 31614), (Start: 19 @31710 has 51 MA's), (26, 31776), (43, 31875), (45, 31884),

Gene: Dexers_43 Start: 32011, Stop: 32367, Start Num: 19

Candidate Starts for Dexers_43:

(11, 31711), (18, 31921), (Start: 19 @32011 has 51 MA's), (32, 32101), (45, 32194), (71, 32314),

Gene: Diane_44 Start: 31566, Stop: 31922, Start Num: 19

Candidate Starts for Diane_44:

(9, 30975), (10, 31059), (11, 31263), (14, 31326), (15, 31329), (17, 31470), (Start: 19 @31566 has 51 MA's), (23, 31593), (29, 31656), (39, 31710), (41, 31728), (47, 31770),

Gene: Dwayne_44 Start: 30766, Stop: 31125, Start Num: 20

Candidate Starts for Dwayne_44:

(11, 30436), (12, 30475), (15, 30502), (18, 30646), (Start: 20 @30766 has 49 MA's), (29, 30847), (39, 30901), (41, 30919), (50, 30967), (59, 31009), (74, 31117),

Gene: ELB20_44 Start: 32192, Stop: 32545, Start Num: 19

Candidate Starts for ELB20_44:

(1, 31205), (2, 31235), (6, 31295), (11, 31889), (15, 31955), (17, 32096), (Start: 19 @32192 has 51 MA's), (25, 32255), (41, 32345), (47, 32387),

Gene: Eddasa_45 Start: 30752, Stop: 31108, Start Num: 20

Candidate Starts for Eddasa_45:

(11, 30422), (12, 30461), (14, 30485), (15, 30488), (18, 30632), (Start: 20 @30752 has 49 MA's), (31, 30845), (38, 30881), (42, 30926), (46, 30953), (50, 30968), (67, 31040), (68, 31052),

Gene: Ejemplo_43 Start: 30707, Stop: 31063, Start Num: 20

Candidate Starts for Ejemplo_43:

(11, 30377), (12, 30416), (14, 30440), (15, 30443), (18, 30587), (Start: 20 @30707 has 49 MA's), (39, 30842), (41, 30860), (58, 30944), (59, 30947), (74, 31055),

Gene: ElGato_45 Start: 31651, Stop: 32007, Start Num: 19

Candidate Starts for ElGato_45:

(11, 31351), (18, 31561), (Start: 19 @31651 has 51 MA's), (32, 31741), (45, 31834), (70, 31945), (71, 31954),

Gene: Emaanora_47 Start: 30724, Stop: 31083, Start Num: 20

Candidate Starts for Emaanora_47:

(11, 30394), (12, 30433), (15, 30460), (18, 30604), (Start: 20 @30724 has 49 MA's), (29, 30805), (39, 30859), (41, 30877), (50, 30925), (59, 30967), (74, 31075),

Gene: EnochSoames_47 Start: 30747, Stop: 31103, Start Num: 20

Candidate Starts for EnochSoames_47:

(11, 30417), (12, 30456), (14, 30480), (15, 30483), (18, 30627), (Start: 20 @30747 has 49 MA's), (31, 30840), (38, 30876), (42, 30921), (46, 30948), (50, 30963), (68, 31047),

Gene: Esperer_44 Start: 30255, Stop: 30611, Start Num: 20

Candidate Starts for Esperer_44:

(18, 30129), (Start: 20 @30255 has 49 MA's), (25, 30318), (31, 30348), (38, 30384), (46, 30456), (50, 30471), (67, 30543), (68, 30555),

Gene: GirlDinner_44 Start: 31345, Stop: 31707, Start Num: 19

Candidate Starts for GirlDinner_44:

(10, 30838), (11, 31042), (14, 31105), (15, 31108), (17, 31249), (Start: 19 @31345 has 51 MA's), (23, 31372), (29, 31435), (41, 31507), (47, 31549), (65, 31627),

Gene: Goby_44 Start: 31256, Stop: 31615, Start Num: 20

Candidate Starts for Goby_44:

(11, 30926), (12, 30965), (14, 30989), (15, 30992), (18, 31136), (Start: 20 @31256 has 49 MA's), (29, 31337), (39, 31391), (41, 31409), (58, 31496), (74, 31607),

Gene: Godpower_45 Start: 31239, Stop: 31592, Start Num: 20

Candidate Starts for Godpower_45:

(11, 30909), (12, 30948), (15, 30975), (18, 31119), (Start: 20 @31239 has 49 MA's), (25, 31302), (35, 31335), (39, 31374), (41, 31392), (46, 31422), (48, 31434), (53, 31455), (74, 31584),

Gene: GreenWeasel_46 Start: 30903, Stop: 31250, Start Num: 19

Candidate Starts for GreenWeasel_46:

(11, 30600), (15, 30666), (18, 30810), (Start: 19 @30903 has 51 MA's), (25, 30966), (29, 30984), (Start: 30 @30987 has 1 MA's), (38, 31017), (45, 31086), (61, 31161), (66, 31182), (73, 31227),

Gene: Haizum_46 Start: 31681, Stop: 32037, Start Num: 19

Candidate Starts for Haizum_46:

(11, 31378), (14, 31441), (15, 31444), (17, 31585), (Start: 19 @31681 has 51 MA's), (23, 31708), (29, 31771), (39, 31825), (41, 31843), (47, 31885),

Gene: Hank144_47 Start: 31894, Stop: 32256, Start Num: 19

Candidate Starts for Hank144_47:

(14, 31654), (15, 31657), (17, 31798), (Start: 19 @31894 has 51 MA's), (23, 31921), (29, 31984), (41, 32056), (47, 32098), (53, 32119),

Gene: Hippo_44 Start: 30778, Stop: 31137, Start Num: 20

Candidate Starts for Hippo_44:

(11, 30448), (12, 30487), (15, 30514), (18, 30658), (Start: 20 @30778 has 49 MA's), (29, 30859), (39, 30913), (41, 30931), (50, 30979), (59, 31021), (74, 31129),

Gene: Indigo_43 Start: 30435, Stop: 30791, Start Num: 20

Candidate Starts for Indigo_43:

(11, 30099), (14, 30162), (15, 30165), (18, 30309), (Start: 20 @30435 has 49 MA's), (25, 30498), (31, 30528), (36, 30543), (38, 30564), (46, 30636), (50, 30651), (67, 30723), (68, 30735),

Gene: Issmi_46 Start: 32268, Stop: 32627, Start Num: 19

Candidate Starts for Issmi_46:

(11, 31965), (14, 32028), (15, 32031), (17, 32172), (Start: 19 @32268 has 51 MA's), (24, 32325), (25, 32337), (41, 32427), (47, 32469), (50, 32472),

Gene: Itza_46 Start: 31289, Stop: 31654, Start Num: 19

Candidate Starts for Itza_46:

(3, 30332), (11, 30986), (15, 31052), (18, 31196), (Start: 19 @31289 has 51 MA's), (29, 31370), (32, 31379), (62, 31547), (69, 31592),

Gene: Izzy_45 Start: 30799, Stop: 31155, Start Num: 20

Candidate Starts for Izzy_45:

(11, 30469), (12, 30508), (14, 30532), (15, 30535), (18, 30679), (Start: 20 @30799 has 49 MA's), (31, 30892), (38, 30928), (42, 30973), (46, 31000), (50, 31015), (67, 31087), (68, 31099),

Gene: Janus_45 Start: 31685, Stop: 32047, Start Num: 19

Candidate Starts for Janus_45:

(10, 31178), (11, 31382), (14, 31445), (15, 31448), (17, 31589), (Start: 19 @31685 has 51 MA's), (23, 31712), (29, 31775), (41, 31847), (47, 31889), (65, 31967),

Gene: Jash_45 Start: 30752, Stop: 31108, Start Num: 20

Candidate Starts for Jash_45:

(11, 30422), (12, 30461), (14, 30485), (15, 30488), (18, 30632), (Start: 20 @30752 has 49 MA's), (31, 30845), (38, 30881), (42, 30926), (46, 30953), (50, 30968), (67, 31040), (68, 31052),

Gene: Jevington_47 Start: 32067, Stop: 32426, Start Num: 19

Candidate Starts for Jevington_47:

(14, 31827), (15, 31830), (17, 31971), (Start: 19 @32067 has 51 MA's), (29, 32148), (38, 32181), (43, 32241), (62, 32325), (67, 32346),

Gene: Jhitchelle_44 Start: 31530, Stop: 31883, Start Num: 19

Candidate Starts for Jhitchelle_44:

(11, 31230), (18, 31440), (Start: 19 @31530 has 51 MA's), (34, 31623), (37, 31629), (74, 31875),

Gene: Kaine_44 Start: 31802, Stop: 32158, Start Num: 19

Candidate Starts for Kaine_44:

(11, 31502), (18, 31712), (Start: 19 @31802 has 51 MA's), (32, 31892), (45, 31985), (71, 32105),

Gene: Katalie_44 Start: 30972, Stop: 31334, Start Num: 20

Candidate Starts for Katalie_44:

(Start: 20 @30972 has 49 MA's), (29, 31056), (41, 31128), (74, 31326),

Gene: Lannister_46 Start: 31432, Stop: 31791, Start Num: 20

Candidate Starts for Lannister_46:

(11, 31102), (14, 31165), (15, 31168), (18, 31312), (Start: 20 @31432 has 49 MA's), (29, 31513), (39, 31567), (41, 31585), (74, 31783),

Gene: Leviticus_44 Start: 30439, Stop: 30795, Start Num: 20

Candidate Starts for Leviticus_44:

(18, 30313), (Start: 20 @30439 has 49 MA's), (25, 30502), (31, 30532), (38, 30568), (46, 30640), (50, 30655), (67, 30727), (68, 30739),

Gene: Lika_44 Start: 31242, Stop: 31595, Start Num: 20

Candidate Starts for Lika_44:

(11, 30912), (12, 30951), (15, 30978), (18, 31122), (Start: 20 @31242 has 49 MA's), (25, 31305), (35, 31338), (39, 31377), (41, 31395), (46, 31425), (48, 31437), (53, 31458), (74, 31587),

Gene: Loofah_46 Start: 32074, Stop: 32430, Start Num: 19

Candidate Starts for Loofah_46:

(11, 31771), (12, 31810), (14, 31834), (15, 31837), (16, 31933), (17, 31978), (18, 31981), (Start: 19 @32074 has 51 MA's), (41, 32227), (49, 32272),

Gene: Lorelei_45 Start: 31293, Stop: 31649, Start Num: 20

Candidate Starts for Lorelei_45:

(Start: 20 @31293 has 49 MA's), (25, 31359), (26, 31362), (29, 31377), (41, 31449), (48, 31491), (50, 31494), (53, 31512), (74, 31641),

Gene: Maneekul_44 Start: 30797, Stop: 31153, Start Num: 20

Candidate Starts for Maneekul_44:

(11, 30467), (12, 30506), (14, 30530), (15, 30533), (18, 30677), (Start: 20 @30797 has 49 MA's), (39, 30932), (41, 30950), (58, 31034), (59, 31037), (74, 31145),

Gene: Marav_48 Start: 32389, Stop: 32736, Start Num: 19

Candidate Starts for Marav_48:

(14, 32149), (15, 32152), (17, 32293), (Start: 19 @32389 has 51 MA's), (29, 32470), (43, 32557), (55, 32605), (58, 32617), (74, 32728),

Gene: Nabi_45 Start: 31293, Stop: 31649, Start Num: 20

Candidate Starts for Nabi_45:

(Start: 20 @31293 has 49 MA's), (25, 31359), (26, 31362), (29, 31377), (41, 31449), (48, 31491), (50, 31494), (53, 31512), (74, 31641),

Gene: Nanodon_46 Start: 31082, Stop: 31435, Start Num: 20

Candidate Starts for Nanodon_46:

(11, 30746), (14, 30809), (15, 30812), (18, 30956), (Start: 20 @31082 has 49 MA's), (38, 31211), (50, 31298), (67, 31367), (73, 31412),

Gene: Nerdos_43 Start: 30434, Stop: 30790, Start Num: 20

Candidate Starts for Nerdos_43:

(18, 30308), (Start: 20 @30434 has 49 MA's), (25, 30497), (31, 30527), (38, 30563), (46, 30635), (50, 30650), (67, 30722), (68, 30734),

Gene: Nishikigoi_46 Start: 31681, Stop: 32037, Start Num: 19

Candidate Starts for Nishikigoi_46:

(9, 31090), (10, 31174), (11, 31378), (14, 31441), (15, 31444), (17, 31585), (Start: 19 @31681 has 51 MA's), (23, 31708), (29, 31771), (39, 31825), (41, 31843), (47, 31885),

Gene: Oliynyk_45 Start: 30752, Stop: 31108, Start Num: 20

Candidate Starts for Oliynyk_45:

(11, 30422), (12, 30461), (14, 30485), (15, 30488), (18, 30632), (Start: 20 @30752 has 49 MA's), (31, 30845), (38, 30881), (42, 30926), (46, 30953), (50, 30968), (67, 31040), (68, 31052),

Gene: Omar_47 Start: 31950, Stop: 32219, Start Num: 30

Candidate Starts for Omar_47:

(14, 31629), (15, 31632), (Start: 30 @31950 has 1 MA's), (47, 32067), (50, 32070), (58, 32109), (64, 32139),

Gene: OzzyJ_45 Start: 30766, Stop: 31125, Start Num: 20

Candidate Starts for OzzyJ_45:

(11, 30436), (12, 30475), (15, 30502), (18, 30646), (Start: 20 @30766 has 49 MA's), (29, 30847), (39, 30901), (41, 30919), (50, 30967), (59, 31009), (74, 31117),

Gene: Pablito_45 Start: 31466, Stop: 31822, Start Num: 19

Candidate Starts for Pablito_45:

(Start: 19 @31466 has 51 MA's), (29, 31556), (38, 31589), (72, 31775),

Gene: Paedore_45 Start: 32059, Stop: 32415, Start Num: 19

Candidate Starts for Paedore_45:

(11, 31756), (12, 31795), (14, 31819), (15, 31822), (16, 31918), (17, 31963), (18, 31966), (Start: 19 @32059 has 51 MA's), (41, 32212), (49, 32257),

Gene: Paolo_47 Start: 32252, Stop: 32605, Start Num: 19

Candidate Starts for Paolo_47:

(14, 32012), (15, 32015), (17, 32156), (Start: 19 @32252 has 51 MA's), (41, 32405), (47, 32447),

Gene: Pavo_45 Start: 32251, Stop: 32607, Start Num: 19

Candidate Starts for Pavo_45:

(11, 31951), (18, 32161), (Start: 19 @32251 has 51 MA's), (29, 32332), (32, 32341), (45, 32434), (70, 32545), (71, 32554),

Gene: Phettuccine_44 Start: 30435, Stop: 30791, Start Num: 20

Candidate Starts for Phettuccine_44:

(18, 30309), (Start: 20 @30435 has 49 MA's), (25, 30498), (31, 30528), (38, 30564), (46, 30636), (50, 30651), (67, 30723), (68, 30735),

Gene: Provolone_45 Start: 31633, Stop: 31989, Start Num: 19

Candidate Starts for Provolone_45:

(11, 31333), (18, 31543), (Start: 19 @31633 has 51 MA's), (29, 31714), (32, 31723), (45, 31816), (70, 31927), (71, 31936),

Gene: Puginator_47 Start: 32282, Stop: 32623, Start Num: 19

Candidate Starts for Puginator_47:

(1, 31286), (2, 31316), (4, 31370), (10, 31775), (11, 31979), (15, 32045), (17, 32186), (Start: 19 @32282 has 51 MA's), (45, 32456), (75, 32618),

Gene: R4_46 Start: 32220, Stop: 32561, Start Num: 19

Candidate Starts for R4_46:

(11, 31917), (15, 31983), (17, 32124), (Start: 19 @32220 has 51 MA's), (28, 32298), (40, 32352), (43, 32385),

Gene: Rana_45 Start: 31293, Stop: 31649, Start Num: 20

Candidate Starts for Rana_45:

(Start: 20 @31293 has 49 MA's), (25, 31359), (26, 31362), (29, 31377), (41, 31449), (48, 31491), (50, 31494), (53, 31512), (74, 31641),

Gene: RedBear_45 Start: 30972, Stop: 31334, Start Num: 20

Candidate Starts for RedBear_45:

(Start: 20 @30972 has 49 MA's), (29, 31056), (41, 31128), (74, 31326),

Gene: Rusticus_45 Start: 30752, Stop: 31108, Start Num: 20

Candidate Starts for Rusticus_45:

(11, 30422), (12, 30461), (14, 30485), (15, 30488), (18, 30632), (Start: 20 @30752 has 49 MA's), (31, 30845), (38, 30881), (42, 30926), (46, 30953), (50, 30968), (67, 31040), (68, 31052),

Gene: Saftant_44 Start: 32211, Stop: 32564, Start Num: 19

Candidate Starts for Saftant_44:

(11, 31911), (18, 32121), (Start: 19 @32211 has 51 MA's), (32, 32301), (45, 32394), (62, 32457), (71, 32514),

Gene: SarahRose_44 Start: 30774, Stop: 31133, Start Num: 20

Candidate Starts for SarahRose_44:

(11, 30444), (12, 30483), (15, 30510), (18, 30654), (Start: 20 @30774 has 49 MA's), (29, 30855), (39, 30909), (41, 30927), (50, 30975), (56, 31008), (59, 31017), (74, 31125),

Gene: Snorlax_44 Start: 30778, Stop: 31137, Start Num: 20

Candidate Starts for Snorlax_44:

(11, 30448), (12, 30487), (15, 30514), (18, 30658), (Start: 20 @30778 has 49 MA's), (29, 30859), (39, 30913), (41, 30931), (50, 30979), (51, 30988), (59, 31021), (74, 31129),

Gene: South40_44 Start: 30972, Stop: 31334, Start Num: 20

Candidate Starts for South40_44:

(Start: 20 @30972 has 49 MA's), (29, 31056), (41, 31128), (74, 31326),

Gene: Speedwell_49 Start: 33501, Stop: 33854, Start Num: 19

Candidate Starts for Speedwell_49:

(11, 33201), (18, 33411), (Start: 19 @33501 has 51 MA's), (32, 33591), (45, 33684), (54, 33714), (71, 33804),

Gene: SqueakyClean_44 Start: 31776, Stop: 32138, Start Num: 19

Candidate Starts for SqueakyClean_44:

(10, 31269), (11, 31473), (14, 31536), (15, 31539), (17, 31680), (Start: 19 @31776 has 51 MA's), (23, 31803), (29, 31866), (41, 31938), (47, 31980), (65, 32058),

Gene: Sudan_45 Start: 32089, Stop: 32445, Start Num: 19

Candidate Starts for Sudan_45:

(11, 31789), (18, 31999), (Start: 19 @32089 has 51 MA's), (32, 32179), (45, 32272), (71, 32392),

Gene: Sujidade_45 Start: 31524, Stop: 31883, Start Num: 20

Candidate Starts for Sujidade_45:

(7, 30783), (11, 31194), (12, 31233), (15, 31260), (18, 31404), (Start: 20 @31524 has 49 MA's), (29, 31605), (33, 31617), (39, 31659), (41, 31677), (56, 31758), (58, 31764), (63, 31788), (74, 31875),

Gene: Superstar_49 Start: 32964, Stop: 33305, Start Num: 19

Candidate Starts for Superstar_49:

(11, 32661), (14, 32724), (15, 32727), (17, 32868), (Start: 19 @32964 has 51 MA's), (40, 33096), (45, 33138),

Gene: TagePhighter_46 Start: 30778, Stop: 31137, Start Num: 20

Candidate Starts for TagePhighter_46:

(11, 30448), (12, 30487), (15, 30514), (18, 30658), (Start: 20 @30778 has 49 MA's), (29, 30859), (39, 30913), (41, 30931), (50, 30979), (59, 31021), (74, 31129),

Gene: Tefunt_46 Start: 31683, Stop: 32039, Start Num: 19

Candidate Starts for Tefunt_46:

(11, 31380), (14, 31443), (15, 31446), (17, 31587), (Start: 19 @31683 has 51 MA's), (23, 31710), (29, 31773), (39, 31827), (41, 31845), (47, 31887),

Gene: Thestral_46 Start: 31880, Stop: 32233, Start Num: 19

Candidate Starts for Thestral_46:

(10, 31373), (11, 31577), (12, 31616), (14, 31640), (15, 31643), (16, 31739), (17, 31784), (18, 31787), (Start: 19 @31880 has 51 MA's), (21, 31886), (39, 32015), (41, 32033), (47, 32075), (73, 32201),

Gene: TinaBelcher_44 Start: 31827, Stop: 32180, Start Num: 19

Candidate Starts for TinaBelcher_44:

(10, 31320), (11, 31524), (12, 31563), (14, 31587), (15, 31590), (16, 31686), (17, 31731), (18, 31734), (Start: 19 @31827 has 51 MA's), (21, 31833), (27, 31899), (39, 31962), (41, 31980), (47, 32022), (73, 32148),

Gene: Toma_44 Start: 31256, Stop: 31615, Start Num: 20

Candidate Starts for Toma_44:

(11, 30926), (12, 30965), (14, 30989), (15, 30992), (18, 31136), (Start: 20 @31256 has 49 MA's), (29, 31337), (39, 31391), (41, 31409), (58, 31496), (74, 31607),

Gene: Triste_44 Start: 30766, Stop: 31125, Start Num: 20

Candidate Starts for Triste_44:

(11, 30436), (12, 30475), (15, 30502), (18, 30646), (Start: 20 @30766 has 49 MA's), (29, 30847), (39, 30901), (41, 30919), (50, 30967), (59, 31009), (74, 31117),

Gene: Triumph_47 Start: 31816, Stop: 32160, Start Num: 19

Candidate Starts for Triumph_47:

(10, 31309), (11, 31513), (14, 31576), (15, 31579), (17, 31720), (Start: 19 @31816 has 51 MA's), (26, 31882), (55, 32029),

Gene: TrvxScott_43 Start: 31873, Stop: 32226, Start Num: 19

Candidate Starts for TrvxScott_43:

(1, 30877), (2, 30907), (4, 30961), (10, 31366), (11, 31570), (12, 31609), (14, 31633), (15, 31636), (16, 31732), (17, 31777), (18, 31780), (Start: 19 @31873 has 51 MA's), (21, 31879), (39, 32008), (41, 32026), (47, 32068), (73, 32194),

Gene: TuanPN_43 Start: 30707, Stop: 31063, Start Num: 20

Candidate Starts for TuanPN_43:

(11, 30377), (12, 30416), (14, 30440), (15, 30443), (18, 30587), (Start: 20 @30707 has 49 MA's), (39, 30842), (41, 30860), (58, 30944), (59, 30947), (74, 31055),

Gene: Unstoppable_44 Start: 30430, Stop: 30786, Start Num: 20

Candidate Starts for Unstoppable_44:

(18, 30304), (Start: 20 @30430 has 49 MA's), (25, 30493), (31, 30523), (38, 30559), (46, 30631), (50, 30646), (67, 30718), (68, 30730),

Gene: Urza_46 Start: 31310, Stop: 31675, Start Num: 19

Candidate Starts for Urza_46:

(3, 30353), (11, 31007), (15, 31073), (18, 31217), (Start: 19 @31310 has 51 MA's), (29, 31391), (32, 31400), (62, 31568), (69, 31613),

Gene: Vanseggelen_49 Start: 31734, Stop: 32087, Start Num: 19

Candidate Starts for Vanseggelen_49:

(11, 31434), (18, 31644), (Start: 19 @31734 has 51 MA's), (45, 31908), (58, 31968), (64, 31998), (67, 32007), (74, 32079),

Gene: Verabelle_48 Start: 32295, Stop: 32648, Start Num: 19

Candidate Starts for Verabelle_48:

(11, 31995), (18, 32205), (Start: 19 @32295 has 51 MA's), (37, 32394), (74, 32640),

Gene: Verse_44 Start: 32888, Stop: 33241, Start Num: 19

Candidate Starts for Verse_44:

(11, 32588), (18, 32798), (Start: 19 @32888 has 51 MA's), (45, 33071), (71, 33191),

Gene: VieEnRose_46 Start: 31380, Stop: 31736, Start Num: 19

Candidate Starts for VieEnRose_46:

(11, 31077), (15, 31143), (18, 31287), (Start: 19 @31380 has 51 MA's), (Start: 30 @31470 has 1 MA's), (45, 31569), (58, 31611),

Gene: Werner_44 Start: 30776, Stop: 31135, Start Num: 20

Candidate Starts for Werner_44:

(11, 30446), (12, 30485), (15, 30512), (18, 30656), (Start: 20 @30776 has 49 MA's), (29, 30857), (39, 30911), (41, 30929), (50, 30977), (59, 31019), (74, 31127),

Gene: Whatever_44 Start: 30776, Stop: 31135, Start Num: 20

Candidate Starts for Whatever_44:

(11, 30446), (12, 30485), (15, 30512), (18, 30656), (Start: 20 @30776 has 49 MA's), (29, 30857), (39, 30911), (41, 30929), (50, 30977), (59, 31019), (74, 31127),

Gene: Yasdnil_44 Start: 30825, Stop: 31181, Start Num: 20

Candidate Starts for Yasdnil_44:

(11, 30495), (12, 30534), (14, 30558), (15, 30561), (18, 30705), (Start: 20 @30825 has 49 MA's), (39, 30960), (41, 30978), (58, 31062), (59, 31065), (74, 31173),

Gene: Yosif_47 Start: 32857, Stop: 33213, Start Num: 19

Candidate Starts for Yosif_47:

(14, 32620), (15, 32623), (18, 32767), (Start: 19 @32857 has 51 MA's), (44, 33040), (45, 33043), (62, 33106),

Gene: Zainub_47 Start: 32228, Stop: 32575, Start Num: 19

Candidate Starts for Zainub_47:

(14, 31988), (15, 31991), (17, 32132), (Start: 19 @32228 has 51 MA's), (29, 32309), (71, 32525),

Gene: ZamZam_46 Start: 32184, Stop: 32540, Start Num: 19

Candidate Starts for ZamZam_46:

(11, 31884), (18, 32094), (Start: 19 @32184 has 51 MA's), (22, 32199), (32, 32277), (45, 32370), (54, 32400), (71, 32490),

Gene: Zemlya_46 Start: 31315, Stop: 31671, Start Num: 20

Candidate Starts for Zemlya_46:

(Start: 20 @31315 has 49 MA's), (22, 31330), (38, 31444), (42, 31489), (44, 31507), (46, 31516), (50, 31531), (58, 31564), (60, 31570), (67, 31603), (68, 31615),

Gene: phiCAM_42 Start: 34039, Stop: 34392, Start Num: 19

Candidate Starts for phiCAM_42:

(11, 33739), (18, 33949), (Start: 19 @34039 has 51 MA's), (32, 34129), (45, 34222), (71, 34342),

Gene: phiHau3_46 Start: 30871, Stop: 31215, Start Num: 19

Candidate Starts for phiHau3_46:

(12, 30607), (15, 30634), (18, 30778), (Start: 19 @30871 has 51 MA's), (29, 30952), (33, 30964), (39, 31006), (41, 31024), (47, 31066), (51, 31078), (63, 31132), (73, 31192),