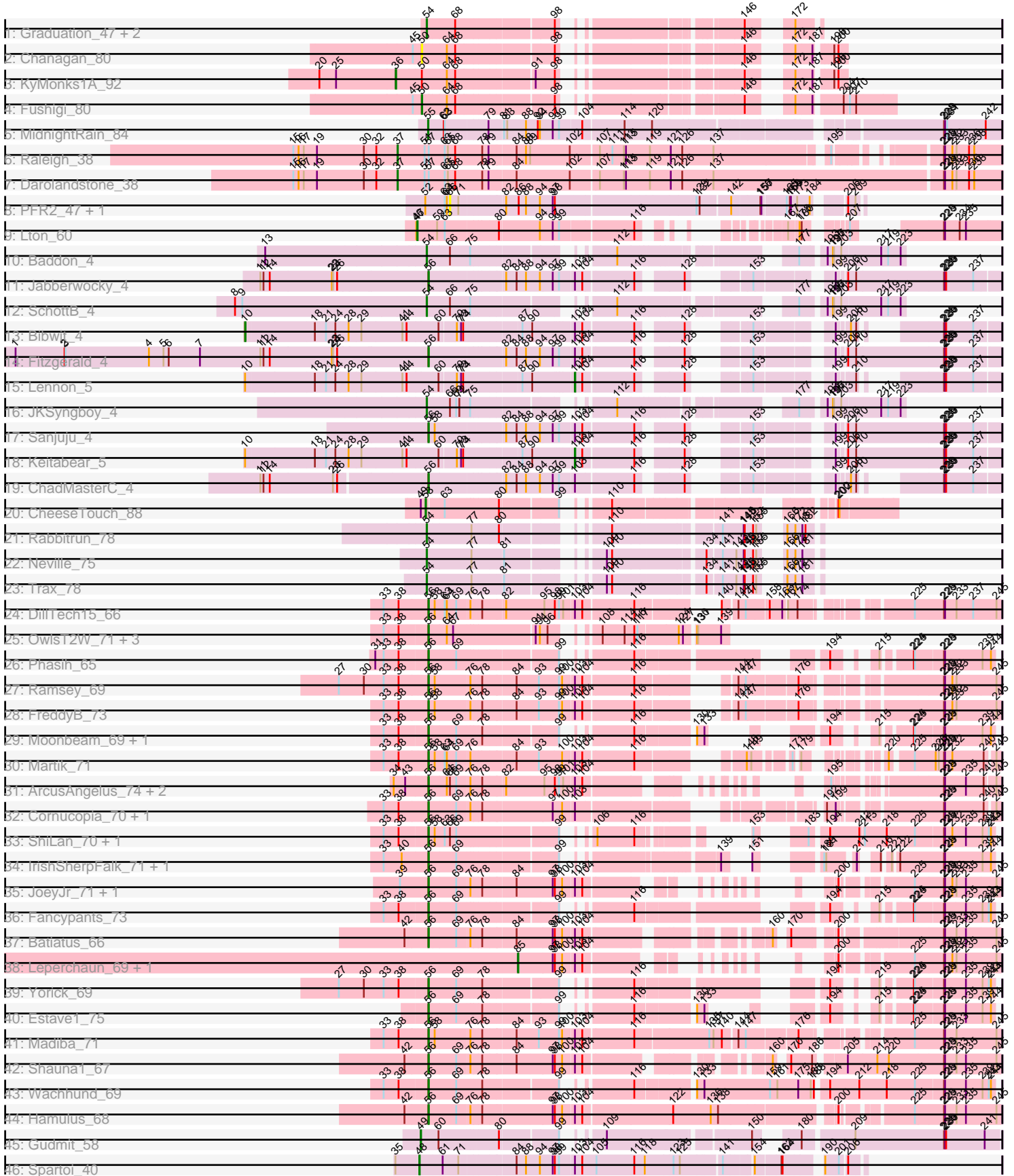


Pham 163622



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 163622 Report

This analysis was run 04/28/24 on database version 559.

Pham number 163622 has 60 members, 4 are drafts.

Phages represented in each track:

- Track 1 : Graduation\_47, Papez\_46, Magnar\_43
- Track 2 : Chanagan\_80
- Track 3 : KyMonks1A\_92
- Track 4 : Fushigi\_80
- Track 5 : MidnightRain\_84
- Track 6 : Raleigh\_38
- Track 7 : Darolandstone\_38
- Track 8 : PFR2\_47, PFR1\_45
- Track 9 : Lton\_60
- Track 10 : Baddon\_4
- Track 11 : Jabberwocky\_4
- Track 12 : SchottB\_4
- Track 13 : Bibwit\_4
- Track 14 : Fitzgerald\_4
- Track 15 : Lennon\_5
- Track 16 : JKSyngboy\_4
- Track 17 : Sanjuju\_4
- Track 18 : Keitabear\_5
- Track 19 : ChadMasterC\_4
- Track 20 : CheeseTouch\_88
- Track 21 : Rabbitrun\_78
- Track 22 : Neville\_75
- Track 23 : Trax\_78
- Track 24 : DillTech15\_66
- Track 25 : OwlsT2W\_71, Royals2015\_75, Rialto\_76, Hades\_69
- Track 26 : Phasih\_65
- Track 27 : Ramsey\_69
- Track 28 : FreddyB\_73
- Track 29 : Moonbeam\_69, Starcevich\_69
- Track 30 : Martik\_71
- Track 31 : ArcusAngelus\_74, Chevrolet\_80, Tweety\_72
- Track 32 : Cornucopia\_70, VRedHorse\_68
- Track 33 : ShiLan\_70, Rita\_76
- Track 34 : IrishSherpFalk\_71, WillSterrel\_71
- Track 35 : JoeyJr\_71, RitaG\_71
- Track 36 : Fancypants\_73
- Track 37 : Batiatus\_66

- Track 38 : Leperchaun\_69, Polka14\_75
- Track 39 : Yorick\_69
- Track 40 : Estave1\_75
- Track 41 : Madiba\_71
- Track 42 : Shauna1\_67
- Track 43 : Wachhund\_69
- Track 44 : Hamulus\_68
- Track 45 : Gudmit\_58
- Track 46 : Spartoi\_40

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

The start number called the most often in the published annotations is 56, it was called in 33 of the 56 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ArcusAngelus\_74, Batiatus\_66, ChadMasterC\_4, Chevrolet\_80, Cornucopia\_70, DillTech15\_66, Estave1\_75, Fancypants\_73, Fitzgerald\_4, FreddyB\_73, Hades\_69, Hamulus\_68, IrishSherpFalk\_71, Jabberwocky\_4, JoeyJr\_71, Madiba\_71, Martik\_71, Moonbeam\_69, Owlst2W\_71, Phasih\_65, Ramsey\_69, Rialto\_76, RitaG\_71, Rita\_76, Royals2015\_75, Sanjuju\_4, Shauna1\_67, ShiLan\_70, Starcevich\_69, Tweety\_72, VRedHorse\_68, Wachhund\_69, WillSterrel\_71, Yorick\_69,

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

- 

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

- Baddon\_4, Bibwit\_4, Chanagan\_80, CheeseTouch\_88, Darolandstone\_38, Fushigi\_80, Graduation\_47, Gudmit\_58, JKSyngboy\_4, Keitabear\_5, KyMonks1A\_92, Lennon\_5, Leperchaun\_69, Lton\_60, Magnar\_43, MidnightRain\_84, Neville\_75, PFR1\_45, PFR2\_47, Papez\_46, Polka14\_75, Rabbitrun\_78, Raleigh\_38, SchottB\_4, Spartoi\_40, Trax\_78,

**Summary by start number:**

Start 10:

- Found in 3 of 60 ( 5.0% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Bibwit\_4 (DE1),

Start 36:

- Found in 1 of 60 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: KyMonks1A\_92 (A1),

Start 37:

- Found in 2 of 60 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 2 of 56

- Called 100.0% of time when present
- Phage (with cluster) where this start called: Darolandstone\_38 (BC2), Raleigh\_38 (BC2),

Start 47:

- Found in 1 of 60 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Lton\_60 (CZ),

Start 48:

- Found in 1 of 60 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Spartoi\_40 (singleton),

Start 49:

- Found in 2 of 60 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Gudmit\_58 (singleton),

Start 50:

- Found in 3 of 60 ( 5.0% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 66.7% of time when present
- Phage (with cluster) where this start called: Chanagan\_80 (A1), Fushigi\_80 (A1),

Start 53:

- Found in 1 of 60 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: CheeseTouch\_88 (DN1),

Start 54:

- Found in 9 of 60 ( 15.0% ) of genes in pham
- Manual Annotations of this start: 9 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Baddon\_4 (DE1), Graduation\_47 (A1), JKSyngboy\_4 (DE1), Magnar\_43 (A1), Neville\_75 (DU2), Papez\_46 (A1), Rabbitrun\_78 (DU2), SchottB\_4 (DE1), Trax\_78 (DU2),

Start 55:

- Found in 1 of 60 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: MidnightRain\_84 (AY),

Start 56:

- Found in 34 of 60 ( 56.7% ) of genes in pham
- Manual Annotations of this start: 33 of 56
- Called 100.0% of time when present

- Phage (with cluster) where this start called: ArcusAngelus\_74 (F1), Batiatus\_66 (F1), ChadMasterC\_4 (DE1), Chevrolet\_80 (F1), Cornucopia\_70 (F1), DillTech15\_66 (F1), Estave1\_75 (F1), Fancypants\_73 (F1), Fitzgerald\_4 (DE1), FreddyB\_73 (F1), Hades\_69 (F1), Hamulus\_68 (F1), IrishSherpFalk\_71 (F1), Jabberwocky\_4 (DE1), JoeyJr\_71 (F1), Madiba\_71 (F1), Martik\_71 (F1), Moonbeam\_69 (F1), OwlsT2W\_71 (F1), Phasih\_65 (F1), Ramsey\_69 (F1), Rialto\_76 (F1), RitaG\_71 (F1), Rita\_76 (F1), Royals2015\_75 (F1), Sanjuju\_4 (DE1), Shauna1\_67 (F1), ShiLan\_70 (F1), Starcevich\_69 (F1), Tweety\_72 (F1), VRedHorse\_68 (F1), Wachhund\_69 (F1), WillSterrel\_71 (F1), Yorick\_69 (F1),

Start 66:

- Found in 10 of 60 ( 16.7% ) of genes in pham
- No Manual Annotations of this start.
- Called 20.0% of time when present
- Phage (with cluster) where this start called: PFR1\_45 (BX), PFR2\_47 (BX),

Start 85:

- Found in 2 of 60 ( 3.3% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Leperchaun\_69 (F1), Polka14\_75 (F1),

Start 103:

- Found in 25 of 60 ( 41.7% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 8.0% of time when present
- Phage (with cluster) where this start called: Keitabear\_5 (DE1), Lennon\_5 (DE1),

### **Summary by clusters:**

There are 10 clusters represented in this pham: F1, singleton, DE1, A1, CZ, DN1, AY, DU2, BX, BC2,

Info for manual annotations of cluster A1:

- Start number 36 was manually annotated 1 time for cluster A1.
- Start number 50 was manually annotated 1 time for cluster A1.
- Start number 54 was manually annotated 3 times for cluster A1.

Info for manual annotations of cluster AY:

- Start number 55 was manually annotated 1 time for cluster AY.

Info for manual annotations of cluster BC2:

- Start number 37 was manually annotated 2 times for cluster BC2.

Info for manual annotations of cluster CZ:

- Start number 47 was manually annotated 1 time for cluster CZ.

Info for manual annotations of cluster DE1:

- Start number 10 was manually annotated 1 time for cluster DE1.
- Start number 54 was manually annotated 3 times for cluster DE1.
- Start number 56 was manually annotated 4 times for cluster DE1.
- Start number 103 was manually annotated 2 times for cluster DE1.

Info for manual annotations of cluster DN1:

- Start number 53 was manually annotated 1 time for cluster DN1.

Info for manual annotations of cluster DU2:

- Start number 54 was manually annotated 3 times for cluster DU2.

Info for manual annotations of cluster F1:

- Start number 56 was manually annotated 29 times for cluster F1.
- Start number 85 was manually annotated 2 times for cluster F1.

### **Gene Information:**

Gene: ArcusAngelus\_74 Start: 44743, Stop: 45855, Start Num: 56

Candidate Starts for ArcusAngelus\_74:

(34, 44644), (43, 44677), (Start: 56 @44743 has 33 MA's), (64, 44791), (66, 44800), (69, 44818), (76, 44854), (78, 44878), (82, 44935), (95, 45040), (98, 45067), (99, 45079), (101, 45091), (Start: 103 @45115 has 2 MA's), (104, 45136), (195, 45472), (228, 45712), (229, 45715), (235, 45772), (240, 45820), (245, 45844),

Gene: Baddon\_4 Start: 2579, Stop: 3649, Start Num: 54

Candidate Starts for Baddon\_4:

(13, 2123), (Start: 54 @2579 has 9 MA's), (66, 2636), (75, 2690), (112, 2984), (177, 3377), (193, 3437), (196, 3452), (197, 3455), (203, 3476), (217, 3581), (219, 3599), (223, 3635),

Gene: Batiatus\_66 Start: 42780, Stop: 44096, Start Num: 56

Candidate Starts for Batiatus\_66:

(42, 42714), (Start: 56 @42780 has 33 MA's), (69, 42855), (76, 42891), (78, 42915), (84, 43002), (97, 43101), (98, 43104), (100, 43125), (Start: 103 @43152 has 2 MA's), (104, 43173), (160, 43572), (170, 43593), (200, 43695), (228, 43944), (229, 43947), (233, 43977), (235, 44004), (245, 44085),

Gene: Bibwit\_4 Start: 2433, Stop: 4142, Start Num: 10

Candidate Starts for Bibwit\_4:

(Start: 10 @2433 has 1 MA's), (18, 2625), (21, 2655), (24, 2682), (28, 2718), (29, 2754), (41, 2871), (44, 2883), (60, 2970), (70, 3012), (73, 3024), (74, 3030), (87, 3174), (90, 3198), (Start: 103 @3294 has 2 MA's), (104, 3315), (116, 3450), (128, 3555), (153, 3651), (199, 3819), (208, 3846), (210, 3861), (228, 3996), (229, 3999), (230, 4002), (237, 4080),

Gene: ChadMasterC\_4 Start: 2379, Stop: 3599, Start Num: 56

Candidate Starts for ChadMasterC\_4:

(11, 1923), (12, 1932), (14, 1950), (23, 2130), (26, 2142), (Start: 56 @2379 has 33 MA's), (82, 2571), (84, 2601), (88, 2628), (94, 2664), (97, 2700), (99, 2715), (Start: 103 @2751 has 2 MA's), (116, 2907), (128, 3012), (153, 3108), (199, 3276), (208, 3303), (210, 3318), (228, 3453), (229, 3456), (230, 3459), (237, 3537),

Gene: Chanagan\_80 Start: 48048, Stop: 47131, Start Num: 50

Candidate Starts for Chanagan\_80:

(45, 48069), (Start: 50 @48048 has 1 MA's), (64, 47982), (68, 47958), (98, 47712), (146, 47328), (172, 47253), (187, 47208), (198, 47169), (200, 47157),

Gene: CheeseTouch\_88 Start: 43473, Stop: 44507, Start Num: 53

Candidate Starts for CheeseTouch\_88:

(Start: 49 @43464 has 1 MA's), (Start: 53 @43473 has 1 MA's), (63, 43515), (80, 43650), (99, 43803), (110, 43863), (200, 44355), (202, 44358),

Gene: Chevrolet\_80 Start: 44744, Stop: 45856, Start Num: 56

Candidate Starts for Chevrolet\_80:

(34, 44645), (43, 44678), (Start: 56 @44744 has 33 MA's), (64, 44792), (66, 44801), (69, 44819), (76, 44855), (78, 44879), (82, 44936), (95, 45041), (98, 45068), (99, 45080), (101, 45092), (Start: 103 @45116 has 2 MA's), (104, 45137), (195, 45473), (228, 45713), (229, 45716), (235, 45773), (240, 45821), (245, 45845),

Gene: Cornucopia\_70 Start: 43350, Stop: 44651, Start Num: 56

Candidate Starts for Cornucopia\_70:

(33, 43227), (38, 43269), (Start: 56 @43350 has 33 MA's), (69, 43425), (76, 43461), (78, 43485), (97, 43671), (100, 43695), (Start: 103 @43722 has 2 MA's), (192, 44238), (199, 44259), (228, 44508), (229, 44511), (240, 44616), (245, 44640),

Gene: Darolandstone\_38 Start: 28753, Stop: 30447, Start Num: 37

Candidate Starts for Darolandstone\_38:

(15, 28456), (16, 28471), (17, 28486), (19, 28522), (30, 28657), (32, 28693), (Start: 37 @28753 has 2 MA's), (51, 28831), (57, 28843), (63, 28885), (65, 28894), (68, 28915), (78, 28993), (79, 29011), (84, 29080), (102, 29233), (107, 29308), (113, 29377), (115, 29383), (119, 29452), (121, 29512), (126, 29545), (137, 29635), (228, 30283), (229, 30286), (232, 30307), (233, 30316), (236, 30352), (238, 30367),

Gene: DillTech15\_66 Start: 41528, Stop: 42871, Start Num: 56

Candidate Starts for DillTech15\_66:

(33, 41405), (38, 41447), (Start: 56 @41528 has 33 MA's), (58, 41543), (63, 41570), (64, 41576), (69, 41603), (76, 41639), (78, 41663), (82, 41720), (95, 41825), (98, 41852), (99, 41864), (101, 41876), (Start: 103 @41900 has 2 MA's), (104, 41921), (116, 42056), (140, 42206), (144, 42242), (147, 42263), (158, 42323), (163, 42359), (167, 42368), (174, 42395), (225, 42638), (228, 42719), (229, 42722), (233, 42752), (237, 42800), (245, 42860),

Gene: Estave1\_75 Start: 47847, Stop: 48950, Start Num: 56

Candidate Starts for Estave1\_75:

(Start: 56 @47847 has 33 MA's), (69, 47922), (78, 47982), (99, 48177), (116, 48300), (130, 48444), (133, 48465), (194, 48594), (215, 48660), (224, 48726), (225, 48729), (228, 48807), (229, 48810), (235, 48867), (239, 48915), (244, 48939),

Gene: Fancypants\_73 Start: 46022, Stop: 47248, Start Num: 56

Candidate Starts for Fancypants\_73:

(33, 45899), (38, 45941), (Start: 56 @46022 has 33 MA's), (69, 46097), (99, 46352), (116, 46475), (194, 46892), (215, 46958), (224, 47024), (225, 47027), (228, 47105), (229, 47108), (235, 47165), (239, 47213), (243, 47231), (244, 47237),

Gene: Fitzgerald\_4 Start: 2397, Stop: 3731, Start Num: 56

Candidate Starts for Fitzgerald\_4:

(1, 1218), (2, 1359), (3, 1362), (4, 1602), (5, 1644), (6, 1659), (7, 1749), (11, 1923), (12, 1932), (14, 1950), (22, 2127), (23, 2130), (26, 2142), (Start: 56 @2397 has 33 MA's), (82, 2589), (84, 2619), (88, 2646), (94, 2682), (97, 2718), (99, 2733), (Start: 103 @2769 has 2 MA's), (104, 2790), (116, 2925), (128, 3030), (153, 3126), (199, 3294), (206, 3315), (210, 3336), (228, 3585), (229, 3588), (230, 3591), (237, 3669),

Gene: FreddyB\_73 Start: 44628, Stop: 45971, Start Num: 56

Candidate Starts for FreddyB\_73:

(33, 44505), (38, 44547), (Start: 56 @44628 has 33 MA's), (58, 44643), (76, 44739), (78, 44763), (84, 44850), (93, 44910), (99, 44964), (100, 44973), (Start: 103 @45000 has 2 MA's), (104, 45021), (116, 45156), (144, 45342), (147, 45363), (176, 45498), (228, 45819), (229, 45822), (232, 45843), (233, 45852), (245, 45960),

Gene: Fushigi\_80 Start: 47333, Stop: 46284, Start Num: 50

Candidate Starts for Fushigi\_80:

(45, 47354), (Start: 50 @47333 has 1 MA's), (64, 47267), (68, 47243), (98, 46997), (146, 46613), (172, 46538), (187, 46493), (204, 46424), (207, 46412), (210, 46394),

Gene: Graduation\_47 Start: 34493, Stop: 33666, Start Num: 54

Candidate Starts for Graduation\_47:

(Start: 54 @34493 has 9 MA's), (68, 34421), (98, 34175), (146, 33791), (172, 33716),

Gene: Gudmit\_58 Start: 34535, Stop: 35920, Start Num: 49

Candidate Starts for Gudmit\_58:

(Start: 49 @34535 has 1 MA's), (60, 34586), (80, 34739), (99, 34892), (109, 34937), (150, 35306), (180, 35381), (209, 35516), (228, 35765), (229, 35768), (230, 35771), (241, 35879),

Gene: Hades\_69 Start: 43298, Stop: 44011, Start Num: 56

Candidate Starts for Hades\_69:

(33, 43175), (38, 43217), (Start: 56 @43298 has 33 MA's), (64, 43346), (67, 43361), (91, 43574), (94, 43586), (96, 43607), (108, 43676), (114, 43739), (116, 43766), (117, 43775), (124, 43886), (127, 43895), (130, 43919), (131, 43922), (139, 43988),

Gene: Hamulus\_68 Start: 43189, Stop: 44649, Start Num: 56

Candidate Starts for Hamulus\_68:

(42, 43123), (Start: 56 @43189 has 33 MA's), (69, 43264), (76, 43300), (78, 43324), (97, 43510), (98, 43513), (100, 43534), (Start: 103 @43561 has 2 MA's), (104, 43582), (122, 43828), (136, 43936), (138, 43957), (200, 44257), (225, 44419), (228, 44497), (229, 44500), (233, 44530), (235, 44557), (245, 44638),

Gene: IrishSherpFalk\_71 Start: 45147, Stop: 46322, Start Num: 56

Candidate Starts for IrishSherpFalk\_71:

(33, 45024), (40, 45072), (Start: 56 @45147 has 33 MA's), (69, 45222), (99, 45477), (139, 45804), (151, 45828), (189, 45924), (191, 45930), (211, 45993), (216, 46026), (221, 46041), (222, 46053), (228, 46179), (229, 46182), (239, 46287), (244, 46311),

Gene: JKSyngboy\_4 Start: 2579, Stop: 3643, Start Num: 54

Candidate Starts for JKSyngboy\_4:

(Start: 54 @2579 has 9 MA's), (66, 2636), (69, 2654), (72, 2663), (75, 2690), (112, 2984), (177, 3371), (193, 3431), (196, 3446), (197, 3449), (203, 3470), (217, 3575), (219, 3593), (223, 3629),

Gene: Jabberwocky\_4 Start: 2397, Stop: 3731, Start Num: 56

Candidate Starts for Jabberwocky\_4:

(11, 1923), (12, 1932), (14, 1950), (22, 2127), (23, 2130), (26, 2142), (Start: 56 @2397 has 33 MA's), (82, 2589), (84, 2619), (88, 2646), (94, 2682), (97, 2718), (99, 2733), (Start: 103 @2769 has 2 MA's), (104, 2790), (116, 2925), (128, 3030), (153, 3126), (199, 3294), (206, 3315), (210, 3336), (228, 3585), (229, 3588), (230, 3591), (237, 3669),

Gene: JoeyJr\_71 Start: 45459, Stop: 46547, Start Num: 56



Candidate Starts for JoeyJr\_71:

(39, 45378), (Start: 56 @45459 has 33 MA's), (69, 45534), (76, 45570), (78, 45594), (84, 45681), (97, 45780), (98, 45783), (100, 45804), (Start: 103 @45831 has 2 MA's), (104, 45852), (200, 46155), (225, 46317), (228, 46395), (229, 46398), (232, 46419), (233, 46428), (235, 46455), (245, 46536),

Gene: Keitabear\_5 Start: 4089, Stop: 5051, Start Num: 103

Candidate Starts for Keitabear\_5:

(Start: 10 @3228 has 1 MA's), (18, 3420), (21, 3450), (24, 3477), (28, 3513), (29, 3549), (41, 3666), (44, 3678), (60, 3765), (70, 3807), (73, 3819), (74, 3825), (87, 3969), (90, 3993), (Start: 103 @4089 has 2 MA's), (104, 4110), (116, 4245), (128, 4350), (153, 4446), (199, 4614), (206, 4635), (210, 4656), (228, 4905), (229, 4908), (230, 4911), (237, 4989),

Gene: KyMonks1A\_92 Start: 50898, Stop: 49912, Start Num: 36

Candidate Starts for KyMonks1A\_92:

(20, 51117), (25, 51069), (Start: 36 @50898 has 1 MA's), (Start: 50 @50829 has 1 MA's), (64, 50763), (68, 50739), (91, 50544), (98, 50493), (146, 50109), (172, 50034), (187, 49989), (198, 49950), (200, 49938),

Gene: Lennon\_5 Start: 3295, Stop: 4143, Start Num: 103

Candidate Starts for Lennon\_5:

(Start: 10 @2434 has 1 MA's), (18, 2626), (21, 2656), (24, 2683), (28, 2719), (29, 2755), (41, 2872), (44, 2884), (60, 2971), (70, 3013), (73, 3025), (74, 3031), (87, 3175), (90, 3199), (Start: 103 @3295 has 2 MA's), (104, 3316), (116, 3451), (128, 3556), (153, 3652), (199, 3820), (210, 3862), (228, 3997), (229, 4000), (230, 4003), (237, 4081),

Gene: Leperchaun\_69 Start: 44915, Stop: 45781, Start Num: 85

Candidate Starts for Leperchaun\_69:

(Start: 85 @44915 has 2 MA's), (97, 45014), (98, 45017), (100, 45038), (Start: 103 @45065 has 2 MA's), (104, 45086), (200, 45389), (225, 45551), (228, 45629), (229, 45632), (232, 45653), (233, 45662), (235, 45689), (245, 45770),

Gene: Lton\_60 Start: 35512, Stop: 36642, Start Num: 47

Candidate Starts for Lton\_60:

(46, 35509), (Start: 47 @35512 has 1 MA's), (59, 35560), (63, 35578), (80, 35713), (94, 35821), (97, 35857), (99, 35872), (116, 36064), (167, 36241), (178, 36268), (180, 36274), (207, 36346), (228, 36490), (229, 36493), (234, 36532), (235, 36550),

Gene: Madiba\_71 Start: 44963, Stop: 46402, Start Num: 56

Candidate Starts for Madiba\_71:

(33, 44840), (38, 44882), (Start: 56 @44963 has 33 MA's), (58, 44978), (76, 45074), (78, 45098), (84, 45185), (93, 45245), (99, 45299), (100, 45308), (Start: 103 @45335 has 2 MA's), (104, 45356), (116, 45491), (135, 45698), (137, 45710), (140, 45734), (144, 45770), (147, 45791), (176, 45926), (225, 46169), (228, 46250), (229, 46253), (233, 46283), (245, 46391),

Gene: Magnar\_43 Start: 33305, Stop: 32478, Start Num: 54

Candidate Starts for Magnar\_43:

(Start: 54 @33305 has 9 MA's), (68, 33233), (98, 32987), (146, 32603), (172, 32528),

Gene: Martik\_71 Start: 45731, Stop: 46957, Start Num: 56

Candidate Starts for Martik\_71:

(33, 45608), (38, 45650), (Start: 56 @45731 has 33 MA's), (58, 45746), (63, 45773), (64, 45779), (69, 45806), (76, 45842), (84, 45953), (93, 46013), (100, 46076), (Start: 103 @46103 has 2 MA's), (104, 46124), (116, 46259), (148, 46466), (149, 46478), (171, 46553), (179, 46562), (220, 46682), (225,

46736), (226, 46790), (227, 46799), (228, 46814), (229, 46817), (232, 46838), (240, 46922), (245, 46946),

Gene: MidnightRain\_84 Start: 45169, Stop: 46623, Start Num: 55

Candidate Starts for MidnightRain\_84:

(Start: 55 @45169 has 1 MA's), (62, 45208), (63, 45211), (79, 45322), (81, 45355), (83, 45364), (88, 45418), (92, 45448), (94, 45454), (97, 45490), (99, 45505), (104, 45562), (114, 45673), (120, 45751), (228, 46465), (229, 46468), (231, 46474), (242, 46585),

Gene: Moonbeam\_69 Start: 44939, Stop: 46042, Start Num: 56

Candidate Starts for Moonbeam\_69:

(33, 44816), (38, 44858), (Start: 56 @44939 has 33 MA's), (69, 45014), (78, 45074), (99, 45269), (116, 45392), (130, 45536), (133, 45557), (194, 45686), (215, 45752), (224, 45818), (225, 45821), (228, 45899), (229, 45902), (239, 46007), (244, 46031),

Gene: Neville\_75 Start: 47371, Stop: 48234, Start Num: 54

Candidate Starts for Neville\_75:

(Start: 54 @47371 has 9 MA's), (77, 47485), (81, 47557), (109, 47746), (110, 47761), (134, 48001), (141, 48037), (143, 48076), (145, 48097), (146, 48100), (152, 48121), (155, 48130), (166, 48154), (172, 48175), (181, 48193),

Gene: OwlsT2W\_71 Start: 45043, Stop: 45756, Start Num: 56

Candidate Starts for OwlsT2W\_71:

(33, 44920), (38, 44962), (Start: 56 @45043 has 33 MA's), (64, 45091), (67, 45106), (91, 45319), (94, 45331), (96, 45352), (108, 45421), (114, 45484), (116, 45511), (117, 45520), (124, 45631), (127, 45640), (130, 45664), (131, 45667), (139, 45733),

Gene: PFR1\_45 Start: 31715, Stop: 32761, Start Num: 66

Candidate Starts for PFR1\_45:

(52, 31649), (63, 31700), (64, 31706), (66, 31715), (71, 31739), (82, 31850), (86, 31886), (88, 31907), (94, 31943), (97, 31979), (98, 31982), (129, 32363), (132, 32372), (142, 32453), (156, 32531), (157, 32534), (165, 32600), (168, 32609), (169, 32612), (173, 32630), (184, 32666), (206, 32723), (209, 32744),

Gene: PFR2\_47 Start: 33284, Stop: 34330, Start Num: 66

Candidate Starts for PFR2\_47:

(52, 33218), (63, 33269), (64, 33275), (66, 33284), (71, 33308), (82, 33419), (86, 33455), (88, 33476), (94, 33512), (97, 33548), (98, 33551), (129, 33932), (132, 33941), (142, 34022), (156, 34100), (157, 34103), (165, 34169), (168, 34178), (169, 34181), (173, 34199), (184, 34235), (206, 34292), (209, 34313),

Gene: Papez\_46 Start: 35129, Stop: 34302, Start Num: 54

Candidate Starts for Papez\_46:

(Start: 54 @35129 has 9 MA's), (68, 35057), (98, 34811), (146, 34427), (172, 34352),

Gene: Phasih\_65 Start: 42908, Stop: 44134, Start Num: 56

Candidate Starts for Phasih\_65:

(31, 42761), (33, 42785), (38, 42827), (Start: 56 @42908 has 33 MA's), (69, 42983), (99, 43238), (116, 43361), (194, 43778), (215, 43844), (224, 43910), (225, 43913), (228, 43991), (229, 43994), (239, 44099), (244, 44123),

Gene: Polka14\_75 Start: 46662, Stop: 47525, Start Num: 85

Candidate Starts for Polka14\_75:

(Start: 85 @46662 has 2 MA's), (97, 46758), (98, 46761), (100, 46782), (Start: 103 @46809 has 2 MA's), (104, 46830), (200, 47133), (225, 47295), (228, 47373), (229, 47376), (232, 47397), (233, 47406), (235, 47433), (245, 47514),

Gene: Rabbitrun\_78 Start: 47636, Stop: 48499, Start Num: 54

Candidate Starts for Rabbitrun\_78:

(Start: 54 @47636 has 9 MA's), (77, 47750), (80, 47813), (110, 48026), (141, 48302), (145, 48362), (146, 48365), (152, 48386), (155, 48395), (166, 48419), (172, 48440), (181, 48458), (182, 48467),

Gene: Raleigh\_38 Start: 29256, Stop: 30815, Start Num: 37

Candidate Starts for Raleigh\_38:

(15, 28959), (16, 28974), (17, 28989), (19, 29025), (30, 29160), (32, 29196), (Start: 37 @29256 has 2 MA's), (51, 29334), (57, 29346), (63, 29388), (65, 29397), (68, 29418), (78, 29496), (79, 29514), (84, 29583), (88, 29610), (89, 29622), (102, 29736), (107, 29811), (111, 29847), (113, 29880), (115, 29886), (119, 29955), (121, 30015), (126, 30048), (137, 30138), (195, 30435), (228, 30651), (229, 30654), (232, 30675), (233, 30684), (236, 30720), (238, 30735),

Gene: Ramsey\_69 Start: 45364, Stop: 46707, Start Num: 56

Candidate Starts for Ramsey\_69:

(27, 45112), (30, 45184), (33, 45241), (38, 45283), (Start: 56 @45364 has 33 MA's), (58, 45379), (76, 45475), (78, 45499), (84, 45586), (93, 45646), (99, 45700), (100, 45709), (Start: 103 @45736 has 2 MA's), (104, 45757), (116, 45892), (144, 46078), (147, 46099), (176, 46234), (228, 46555), (229, 46558), (232, 46579), (233, 46588), (245, 46696),

Gene: Rialto\_76 Start: 46410, Stop: 47123, Start Num: 56

Candidate Starts for Rialto\_76:

(33, 46287), (38, 46329), (Start: 56 @46410 has 33 MA's), (64, 46458), (67, 46473), (91, 46686), (94, 46698), (96, 46719), (108, 46788), (114, 46851), (116, 46878), (117, 46887), (124, 46998), (127, 47007), (130, 47031), (131, 47034), (139, 47100),

Gene: Rita\_76 Start: 46350, Stop: 47519, Start Num: 56

Candidate Starts for Rita\_76:

(33, 46227), (38, 46269), (Start: 56 @46350 has 33 MA's), (58, 46365), (63, 46392), (66, 46407), (69, 46425), (99, 46680), (106, 46698), (116, 46803), (153, 46950), (183, 47019), (194, 47061), (212, 47145), (213, 47154), (218, 47217), (225, 47298), (228, 47376), (229, 47379), (232, 47400), (235, 47436), (239, 47484), (243, 47502), (244, 47508),

Gene: RitaG\_71 Start: 45580, Stop: 46668, Start Num: 56

Candidate Starts for RitaG\_71:

(39, 45499), (Start: 56 @45580 has 33 MA's), (69, 45655), (76, 45691), (78, 45715), (84, 45802), (97, 45901), (98, 45904), (100, 45925), (Start: 103 @45952 has 2 MA's), (104, 45973), (200, 46276), (225, 46438), (228, 46516), (229, 46519), (232, 46540), (233, 46549), (235, 46576), (245, 46657),

Gene: Royals2015\_75 Start: 45063, Stop: 45776, Start Num: 56

Candidate Starts for Royals2015\_75:

(33, 44940), (38, 44982), (Start: 56 @45063 has 33 MA's), (64, 45111), (67, 45126), (91, 45339), (94, 45351), (96, 45372), (108, 45441), (114, 45504), (116, 45531), (117, 45540), (124, 45651), (127, 45660), (130, 45684), (131, 45687), (139, 45753),

Gene: Sanjuju\_4 Start: 2435, Stop: 3769, Start Num: 56

Candidate Starts for Sanjuju\_4:

(Start: 56 @2435 has 33 MA's), (58, 2450), (82, 2627), (84, 2657), (88, 2684), (94, 2720), (97, 2756), (99, 2771), (Start: 103 @2807 has 2 MA's), (104, 2828), (116, 2963), (128, 3068), (153, 3164), (199,

3332), (206, 3353), (210, 3374), (228, 3623), (229, 3626), (230, 3629), (237, 3707),

Gene: SchottB\_4 Start: 2583, Stop: 3653, Start Num: 54

Candidate Starts for SchottB\_4:

(8, 2040), (9, 2061), (Start: 54 @2583 has 9 MA's), (66, 2640), (75, 2694), (112, 2988), (177, 3381), (193, 3441), (196, 3456), (197, 3459), (203, 3480), (217, 3585), (219, 3603), (223, 3639),

Gene: Shauna1\_67 Start: 43160, Stop: 44527, Start Num: 56

Candidate Starts for Shauna1\_67:

(42, 43094), (Start: 56 @43160 has 33 MA's), (69, 43235), (76, 43271), (78, 43295), (84, 43382), (97, 43481), (98, 43484), (100, 43505), (Start: 103 @43532 has 2 MA's), (104, 43553), (160, 43952), (170, 43973), (186, 44033), (205, 44105), (214, 44189), (220, 44222), (228, 44375), (229, 44378), (233, 44408), (235, 44435), (245, 44516),

Gene: ShiLan\_70 Start: 46343, Stop: 47512, Start Num: 56

Candidate Starts for ShiLan\_70:

(33, 46220), (38, 46262), (Start: 56 @46343 has 33 MA's), (58, 46358), (63, 46385), (66, 46400), (69, 46418), (99, 46673), (106, 46691), (116, 46796), (153, 46943), (183, 47012), (194, 47054), (212, 47138), (213, 47147), (218, 47210), (225, 47291), (228, 47369), (229, 47372), (232, 47393), (235, 47429), (239, 47477), (243, 47495), (244, 47501),

Gene: Spartoi\_40 Start: 27031, Stop: 28128, Start Num: 48

Candidate Starts for Spartoi\_40:

(35, 26962), (Start: 48 @27031 has 1 MA's), (61, 27088), (71, 27133), (84, 27274), (88, 27301), (94, 27337), (97, 27373), (98, 27376), (99, 27388), (Start: 103 @27424 has 2 MA's), (104, 27445), (105, 27484), (116, 27592), (118, 27619), (123, 27700), (125, 27718), (141, 27823), (154, 27895), (162, 27955), (164, 27958), (190, 28042), (201, 28075), (206, 28087),

Gene: Starcevich\_69 Start: 45704, Stop: 46807, Start Num: 56

Candidate Starts for Starcevich\_69:

(33, 45581), (38, 45623), (Start: 56 @45704 has 33 MA's), (69, 45779), (78, 45839), (99, 46034), (116, 46157), (130, 46301), (133, 46322), (194, 46451), (215, 46517), (224, 46583), (225, 46586), (228, 46664), (229, 46667), (239, 46772), (244, 46796),

Gene: Trax\_78 Start: 48336, Stop: 49199, Start Num: 54

Candidate Starts for Trax\_78:

(Start: 54 @48336 has 9 MA's), (77, 48450), (81, 48522), (109, 48711), (110, 48726), (134, 48966), (141, 49002), (143, 49041), (145, 49062), (146, 49065), (152, 49086), (155, 49095), (166, 49119), (172, 49140), (181, 49158),

Gene: Tweety\_72 Start: 45824, Stop: 46936, Start Num: 56

Candidate Starts for Tweety\_72:

(34, 45725), (43, 45758), (Start: 56 @45824 has 33 MA's), (64, 45872), (66, 45881), (69, 45899), (76, 45935), (78, 45959), (82, 46016), (95, 46121), (98, 46148), (99, 46160), (101, 46172), (Start: 103 @46196 has 2 MA's), (104, 46217), (195, 46553), (228, 46793), (229, 46796), (235, 46853), (240, 46901), (245, 46925),

Gene: VRedHorse\_68 Start: 42168, Stop: 43469, Start Num: 56

Candidate Starts for VRedHorse\_68:

(33, 42045), (38, 42087), (Start: 56 @42168 has 33 MA's), (69, 42243), (76, 42279), (78, 42303), (97, 42489), (100, 42513), (Start: 103 @42540 has 2 MA's), (192, 43056), (199, 43077), (228, 43326), (229, 43329), (240, 43434), (245, 43458),

Gene: Wachhund\_69 Start: 42634, Stop: 44055, Start Num: 56

Candidate Starts for Wachhund\_69:

(33, 42511), (38, 42553), (Start: 56 @42634 has 33 MA's), (69, 42709), (78, 42769), (99, 42964), (116, 43087), (130, 43231), (133, 43252), (159, 43441), (161, 43462), (175, 43522), (185, 43558), (188, 43567), (194, 43594), (212, 43678), (218, 43753), (225, 43834), (228, 43912), (229, 43915), (235, 43972), (239, 44020), (243, 44038), (244, 44044),

Gene: WillSterrel\_71 Start: 45180, Stop: 46355, Start Num: 56

Candidate Starts for WillSterrel\_71:

(33, 45057), (40, 45105), (Start: 56 @45180 has 33 MA's), (69, 45255), (99, 45510), (139, 45837), (151, 45861), (189, 45957), (191, 45963), (211, 46026), (216, 46059), (221, 46074), (222, 46086), (228, 46212), (229, 46215), (239, 46320), (244, 46344),

Gene: Yorick\_69 Start: 45654, Stop: 46880, Start Num: 56

Candidate Starts for Yorick\_69:

(27, 45402), (30, 45474), (33, 45531), (38, 45573), (Start: 56 @45654 has 33 MA's), (69, 45729), (78, 45789), (99, 45984), (116, 46107), (194, 46524), (215, 46590), (224, 46656), (225, 46659), (228, 46737), (229, 46740), (235, 46797), (239, 46845), (243, 46863), (244, 46869),