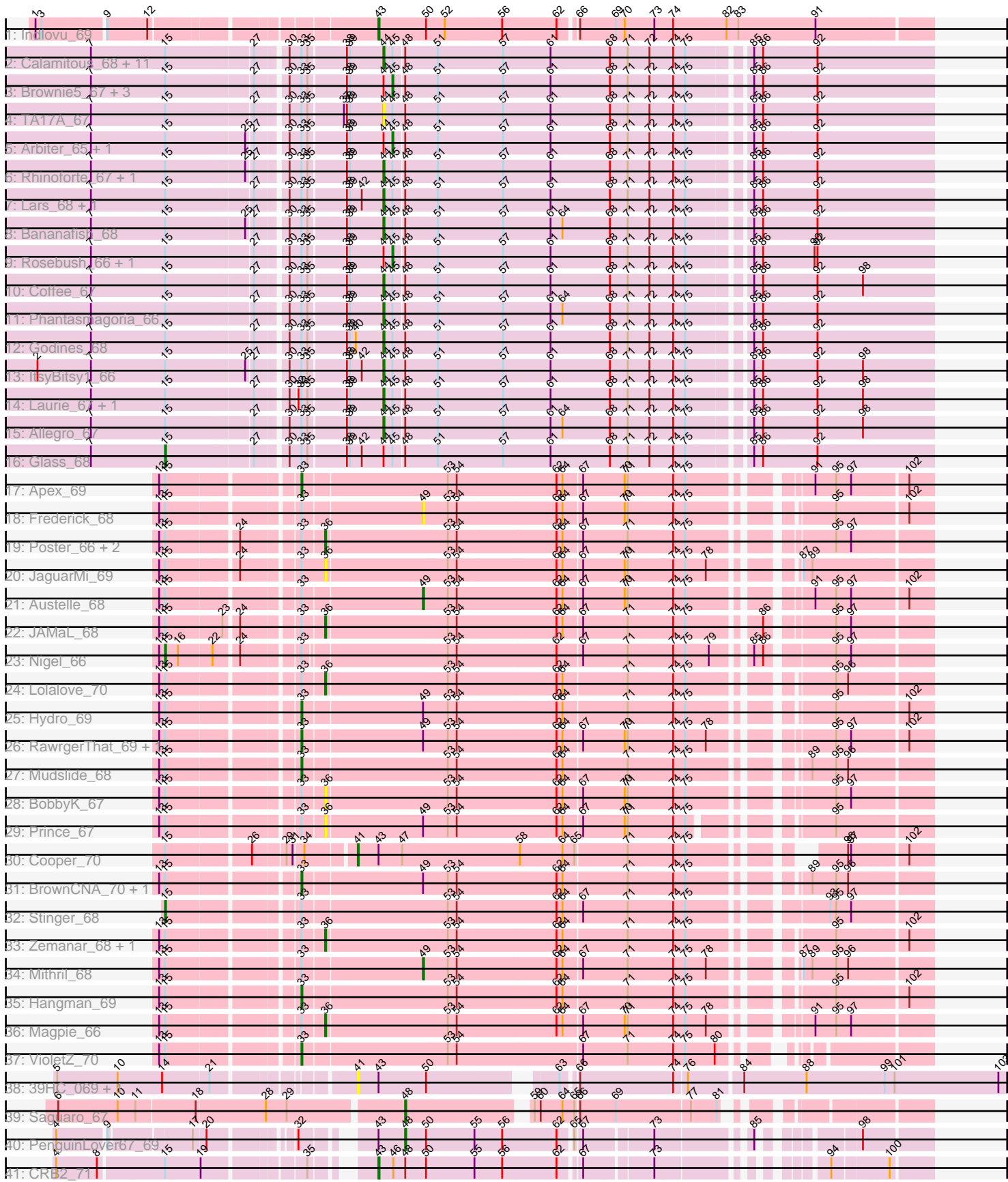


Pham 154713



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 154713 Report

This analysis was run 04/12/24 on database version 558.

Pham number 154713 has 66 members, 10 are drafts.

Phages represented in each track:

- Track 1 : Indlovu\_69
- Track 2 : Calamitous\_68, MasterPo\_68, Eaglehorse\_67, Kaleb\_68, Boyle\_67, Kheth\_67, Sabella\_67, Lephleur\_67, FrenchFry\_68, Opia\_68, Holeinone\_67, Blocker23\_67
- Track 3 : Brownie5\_67, West99\_67, Faze9\_66, Tinciduntsolum\_68
- Track 4 : TA17A\_67
- Track 5 : Arbiter\_65, Ares\_67
- Track 6 : Rhinoforte\_67, Tres\_67
- Track 7 : Lars\_68, LizLemon\_67
- Track 8 : Bananafish\_68
- Track 9 : Rosebush\_66, Qyrzula\_61
- Track 10 : Coffee\_67
- Track 11 : Phantasmagoria\_66
- Track 12 : Godines\_68
- Track 13 : ItsyBitsy1\_66
- Track 14 : Laurie\_67, Hedgerow\_67
- Track 15 : Allegro\_67
- Track 16 : Glass\_68
- Track 17 : Apex\_69
- Track 18 : Frederick\_68
- Track 19 : Poster\_66, ChrisnMich\_68, Nanao\_67
- Track 20 : JaguarMi\_69
- Track 21 : Austelle\_68
- Track 22 : JAMaL\_68
- Track 23 : Nigel\_66
- Track 24 : Lolalove\_70
- Track 25 : Hydro\_69
- Track 26 : RawrgerThat\_69, Fortunato\_69
- Track 27 : Mudslide\_68
- Track 28 : BobbyK\_67
- Track 29 : Prince\_67
- Track 30 : Cooper\_70
- Track 31 : BrownCNA\_70, Waleliano\_68
- Track 32 : Stinger\_68
- Track 33 : Zemanar\_68, Heath\_68
- Track 34 : Mithril\_68
- Track 35 : Hangman\_69

- Track 36 : Magpie\_66
- Track 37 : VioletZ\_70
- Track 38 : 39HC\_069, 40BC\_069
- Track 39 : Saguaro\_67
- Track 40 : PenguinLover67\_69
- Track 41 : CRB2\_71

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

The start number called the most often in the published annotations is 44, it was called in 23 of the 56 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Allegro\_67, Bananafish\_68, Blocker23\_67, Boyle\_67, Calamitous\_68, Coffee\_67, Eaglehorse\_67, FrenchFry\_68, Godines\_68, Hedgerow\_67, Holeinone\_67, ItsyBitsy1\_66, Kaleb\_68, Kheth\_67, Lars\_68, Laurie\_67, Lephleur\_67, LizLemon\_67, MasterPo\_68, Opia\_68, Phantasmagoria\_66, Rhinoforte\_67, Sabella\_67, TA17A\_67, Tres\_67,

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

- Arbiter\_65, Ares\_67, Brownie5\_67, Faze9\_66, Glass\_68, Qyrzula\_61, Rosebush\_66, Tinciduntolum\_68, West99\_67,

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

- 39HC\_069, 40BC\_069, Apex\_69, Austelle\_68, BobbyK\_67, BrownCNA\_70, CRB2\_71, ChrisnMich\_68, Cooper\_70, Fortunato\_69, Frederick\_68, Hangman\_69, Heath\_68, Hydro\_69, Indlovu\_69, JAMaL\_68, JaguarMi\_69, Lolalove\_70, Magpie\_66, Mithril\_68, Mudslide\_68, Nanao\_67, Nigel\_66, PenguinLover67\_69, Poster\_66, Prince\_67, RawrgerThat\_69, Saguaro\_67, Stinger\_68, VioletZ\_70, Waleliano\_68, Zemanar\_68,

**Summary by start number:**

Start 15:

- Found in 61 of 66 ( 92.4% ) of genes in pham
- Manual Annotations of this start: 3 of 56
- Called 4.9% of time when present
- Phage (with cluster) where this start called: Glass\_68 (B2), Nigel\_66 (B4), Stinger\_68 (B4),

Start 33:

- Found in 59 of 66 ( 89.4% ) of genes in pham
- Manual Annotations of this start: 9 of 56
- Called 15.3% of time when present
- Phage (with cluster) where this start called: Apex\_69 (B4), BrownCNA\_70 (B4), Fortunato\_69 (B4), Hangman\_69 (B4), Hydro\_69 (B4), Mudslide\_68 (B4), RawrgerThat\_69 (B4), VioletZ\_70 (B4), Waleliano\_68 (B4),

Start 36:

- Found in 11 of 66 ( 16.7% ) of genes in pham

- Manual Annotations of this start: 6 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BobbyK\_67 (B4), ChrisnMich\_68 (B4), Heath\_68 (B4), JAMaL\_68 (B4), JaguarMi\_69 (B4), Lolalove\_70 (B4), Magpie\_66 (B4), Nanao\_67 (B4), Poster\_66 (B4), Prince\_67 (B4), Zemanar\_68 (B4),

#### Start 41:

- Found in 3 of 66 ( 4.5% ) 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: 39HC\_069 (B6), 40BC\_069 (B6), Cooper\_70 (B4),

#### Start 43:

- Found in 6 of 66 ( 9.1% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 33.3% of time when present
- Phage (with cluster) where this start called: CRB2\_71 (B9), Indlovu\_69 (B11),

#### Start 44:

- Found in 34 of 66 ( 51.5% ) of genes in pham
- Manual Annotations of this start: 23 of 56
- Called 73.5% of time when present
- Phage (with cluster) where this start called: Allegro\_67 (B2), Bananafish\_68 (B2), Blocker23\_67 (B2), Boyle\_67 (B2), Calamitous\_68 (B2), Coffee\_67 (B2), Eaglehorse\_67 (B2), FrenchFry\_68 (B2), Godines\_68 (B2), Hedgerow\_67 (B2), Holeinone\_67 (B2), ItsyBitsy1\_66 (B2), Kaleb\_68 (B2), Kheth\_67 (B2), Lars\_68 (B2), Laurie\_67 (B2), Lephleur\_67 (B2), LizLemon\_67 (B2), MasterPo\_68 (B2), Opia\_68 (B2), Phantasmagoria\_66 (B2), Rhinoforte\_67 (B2), Sabella\_67 (B2), TA17A\_67 (B2), Tres\_67 (B2),

#### Start 45:

- Found in 34 of 66 ( 51.5% ) of genes in pham
- Manual Annotations of this start: 8 of 56
- Called 23.5% of time when present
- Phage (with cluster) where this start called: Arbiter\_65 (B2), Ares\_67 (B2), Brownie5\_67 (B2), Faze9\_66 (B2), Qyrzula\_61 (B2), Rosebush\_66 (B2), Tinciduntolum\_68 (B2), West99\_67 (B2),

#### Start 48:

- Found in 37 of 66 ( 56.1% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 5.4% of time when present
- Phage (with cluster) where this start called: PenguinLover67\_69 (B9), Saguaro\_67 (B7),

#### Start 49:

- Found in 9 of 66 ( 13.6% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Austelle\_68 (B4), Frederick\_68 (B4), Mithril\_68 (B4),

## Summary by clusters:

There are 6 clusters represented in this pham: B4, B6, B7, B2, B11, B9,

Info for manual annotations of cluster B11:

- Start number 43 was manually annotated 1 time for cluster B11.

Info for manual annotations of cluster B2:

- Start number 15 was manually annotated 1 time for cluster B2.
- Start number 44 was manually annotated 23 times for cluster B2.
- Start number 45 was manually annotated 8 times for cluster B2.

Info for manual annotations of cluster B4:

- Start number 15 was manually annotated 2 times for cluster B4.
- Start number 33 was manually annotated 9 times for cluster B4.
- Start number 36 was manually annotated 6 times for cluster B4.
- Start number 41 was manually annotated 1 time for cluster B4.
- Start number 49 was manually annotated 2 times for cluster B4.

Info for manual annotations of cluster B7:

- Start number 48 was manually annotated 1 time for cluster B7.

Info for manual annotations of cluster B9:

- Start number 43 was manually annotated 1 time for cluster B9.
- Start number 48 was manually annotated 1 time for cluster B9.

## Gene Information:

Gene: 39HC\_069 Start: 58780, Stop: 59388, Start Num: 41

Candidate Starts for 39HC\_069:

(5, 58525), (10, 58585), (14, 58630), (21, 58675), (Start: 41 @58780 has 1 MA's), (Start: 43 @58801 has 2 MA's), (50, 58849), (63, 58957), (66, 58969), (74, 59062), (76, 59074), (84, 59125), (88, 59188), (99, 59266), (101, 59275), (103, 59380),

Gene: 40BC\_069 Start: 58780, Stop: 59388, Start Num: 41

Candidate Starts for 40BC\_069:

(5, 58525), (10, 58585), (14, 58630), (21, 58675), (Start: 41 @58780 has 1 MA's), (Start: 43 @58801 has 2 MA's), (50, 58849), (63, 58957), (66, 58969), (74, 59062), (76, 59074), (84, 59125), (88, 59188), (99, 59266), (101, 59275), (103, 59380),

Gene: Allegro\_67 Start: 56819, Stop: 57352, Start Num: 44

Candidate Starts for Allegro\_67:

(7, 56543), (Start: 15 @56618 has 3 MA's), (27, 56702), (30, 56729), (Start: 33 @56741 has 9 MA's), (35, 56747), (38, 56783), (39, 56786), (Start: 44 @56819 has 23 MA's), (Start: 45 @56828 has 8 MA's), (Start: 48 @56837 has 2 MA's), (51, 56870), (57, 56936), (61, 56984), (64, 56996), (68, 57044), (71, 57062), (72, 57083), (74, 57107), (75, 57119), (85, 57173), (86, 57182), (92, 57236), (98, 57281),

Gene: Apex\_69 Start: 60138, Stop: 60722, Start Num: 33

Candidate Starts for Apex\_69:

(13, 60015), (Start: 15 @60021 has 3 MA's), (Start: 33 @60138 has 9 MA's), (53, 60279), (54, 60288), (62, 60387), (64, 60393), (67, 60411), (70, 60453), (71, 60456), (74, 60501), (75, 60513), (91, 60612), (95, 60633), (97, 60648), (102, 60699),

Gene: Arbiter\_65 Start: 56863, Stop: 57387, Start Num: 45

Candidate Starts for Arbiter\_65:

(7, 56578), (Start: 15 @56653 has 3 MA's), (25, 56731), (27, 56737), (30, 56764), (Start: 33 @56776 has 9 MA's), (35, 56782), (38, 56818), (39, 56821), (Start: 44 @56854 has 23 MA's), (Start: 45 @56863 has 8 MA's), (Start: 48 @56872 has 2 MA's), (51, 56905), (57, 56971), (61, 57019), (68, 57079), (71, 57097), (72, 57118), (74, 57142), (75, 57154), (85, 57208), (86, 57217), (92, 57271),

Gene: Ares\_67 Start: 56834, Stop: 57358, Start Num: 45

Candidate Starts for Ares\_67:

(7, 56549), (Start: 15 @56624 has 3 MA's), (25, 56702), (27, 56708), (30, 56735), (Start: 33 @56747 has 9 MA's), (35, 56753), (38, 56789), (39, 56792), (Start: 44 @56825 has 23 MA's), (Start: 45 @56834 has 8 MA's), (Start: 48 @56843 has 2 MA's), (51, 56876), (57, 56942), (61, 56990), (68, 57050), (71, 57068), (72, 57089), (74, 57113), (75, 57125), (85, 57179), (86, 57188), (92, 57242),

Gene: Austelle\_68 Start: 60772, Stop: 61239, Start Num: 49

Candidate Starts for Austelle\_68:

(13, 60532), (Start: 15 @60538 has 3 MA's), (Start: 33 @60655 has 9 MA's), (Start: 49 @60772 has 2 MA's), (53, 60796), (54, 60805), (62, 60904), (64, 60910), (67, 60928), (70, 60970), (71, 60973), (74, 61018), (75, 61030), (91, 61129), (95, 61150), (97, 61165), (102, 61216),

Gene: Bananafish\_68 Start: 56755, Stop: 57288, Start Num: 44

Candidate Starts for Bananafish\_68:

(7, 56479), (Start: 15 @56554 has 3 MA's), (25, 56632), (27, 56638), (30, 56665), (Start: 33 @56677 has 9 MA's), (35, 56683), (38, 56719), (39, 56722), (Start: 44 @56755 has 23 MA's), (Start: 45 @56764 has 8 MA's), (Start: 48 @56773 has 2 MA's), (51, 56806), (57, 56872), (61, 56920), (64, 56932), (68, 56980), (71, 56998), (72, 57019), (74, 57043), (75, 57055), (85, 57109), (86, 57118), (92, 57172),

Gene: Blocker23\_67 Start: 56819, Stop: 57352, Start Num: 44

Candidate Starts for Blocker23\_67:

(7, 56543), (Start: 15 @56618 has 3 MA's), (27, 56702), (30, 56729), (Start: 33 @56741 has 9 MA's), (35, 56747), (38, 56783), (39, 56786), (Start: 44 @56819 has 23 MA's), (Start: 45 @56828 has 8 MA's), (Start: 48 @56837 has 2 MA's), (51, 56870), (57, 56936), (61, 56984), (68, 57044), (71, 57062), (72, 57083), (74, 57107), (75, 57119), (85, 57173), (86, 57182), (92, 57236),

Gene: BobbyK\_67 Start: 59936, Stop: 60499, Start Num: 36

Candidate Starts for BobbyK\_67:

(13, 59792), (Start: 15 @59798 has 3 MA's), (Start: 33 @59915 has 9 MA's), (Start: 36 @59936 has 6 MA's), (53, 60056), (54, 60065), (62, 60164), (64, 60170), (67, 60188), (70, 60230), (71, 60233), (74, 60278), (75, 60290), (95, 60410), (97, 60425),

Gene: Boyle\_67 Start: 56863, Stop: 57396, Start Num: 44

Candidate Starts for Boyle\_67:

(7, 56587), (Start: 15 @56662 has 3 MA's), (27, 56746), (30, 56773), (Start: 33 @56785 has 9 MA's), (35, 56791), (38, 56827), (39, 56830), (Start: 44 @56863 has 23 MA's), (Start: 45 @56872 has 8 MA's), (Start: 48 @56881 has 2 MA's), (51, 56914), (57, 56980), (61, 57028), (68, 57088), (71, 57106), (72, 57127), (74, 57151), (75, 57163), (85, 57217), (86, 57226), (92, 57280),

Gene: BrownCNA\_70 Start: 60292, Stop: 60873, Start Num: 33

Candidate Starts for BrownCNA\_70:

(13, 60169), (Start: 15 @60175 has 3 MA's), (Start: 33 @60292 has 9 MA's), (Start: 49 @60409 has 2 MA's), (53, 60433), (54, 60442), (62, 60541), (64, 60547), (71, 60610), (74, 60655), (75, 60667), (89, 60760), (95, 60784), (96, 60796),

Gene: Brownie5\_67 Start: 56874, Stop: 57398, Start Num: 45

Candidate Starts for Brownie5\_67:

(7, 56589), (Start: 15 @56664 has 3 MA's), (27, 56748), (30, 56775), (Start: 33 @56787 has 9 MA's), (35, 56793), (38, 56829), (39, 56832), (Start: 44 @56865 has 23 MA's), (Start: 45 @56874 has 8 MA's), (Start: 48 @56883 has 2 MA's), (51, 56916), (57, 56982), (61, 57030), (68, 57090), (71, 57108), (72, 57129), (74, 57153), (75, 57165), (85, 57219), (86, 57228), (92, 57282),

Gene: CRB2\_71 Start: 61691, Stop: 62164, Start Num: 43

Candidate Starts for CRB2\_71:

(4, 61424), (8, 61463), (Start: 15 @61526 has 3 MA's), (19, 61559), (35, 61649), (Start: 43 @61691 has 2 MA's), (46, 61706), (Start: 48 @61718 has 2 MA's), (50, 61739), (55, 61787), (56, 61814), (62, 61868), (67, 61886), (73, 61949), (94, 62075), (100, 62126),

Gene: Calamitous\_68 Start: 56753, Stop: 57286, Start Num: 44

Candidate Starts for Calamitous\_68:

(7, 56477), (Start: 15 @56552 has 3 MA's), (27, 56636), (30, 56663), (Start: 33 @56675 has 9 MA's), (35, 56681), (38, 56717), (39, 56720), (Start: 44 @56753 has 23 MA's), (Start: 45 @56762 has 8 MA's), (Start: 48 @56771 has 2 MA's), (51, 56804), (57, 56870), (61, 56918), (68, 56978), (71, 56996), (72, 57017), (74, 57041), (75, 57053), (85, 57107), (86, 57116), (92, 57170),

Gene: ChrisnMich\_68 Start: 59038, Stop: 59601, Start Num: 36

Candidate Starts for ChrisnMich\_68:

(13, 58894), (Start: 15 @58900 has 3 MA's), (24, 58966), (Start: 33 @59017 has 9 MA's), (Start: 36 @59038 has 6 MA's), (53, 59158), (54, 59167), (62, 59266), (64, 59272), (67, 59290), (71, 59335), (74, 59380), (75, 59392), (95, 59512), (97, 59527),

Gene: Coffee\_67 Start: 56857, Stop: 57390, Start Num: 44

Candidate Starts for Coffee\_67:

(7, 56581), (Start: 15 @56656 has 3 MA's), (27, 56740), (30, 56767), (Start: 33 @56779 has 9 MA's), (35, 56785), (38, 56821), (39, 56824), (Start: 44 @56857 has 23 MA's), (Start: 45 @56866 has 8 MA's), (Start: 48 @56875 has 2 MA's), (51, 56908), (57, 56974), (61, 57022), (68, 57082), (71, 57100), (72, 57121), (74, 57145), (75, 57157), (85, 57211), (86, 57220), (92, 57274), (98, 57319),

Gene: Cooper\_70 Start: 59759, Stop: 60271, Start Num: 41

Candidate Starts for Cooper\_70:

(Start: 15 @59591 has 3 MA's), (26, 59669), (29, 59699), (31, 59705), (34, 59714), (Start: 41 @59759 has 1 MA's), (Start: 43 @59780 has 2 MA's), (47, 59804), (58, 59921), (64, 59963), (65, 59975), (71, 60026), (74, 60071), (75, 60083), (96, 60194), (97, 60197), (102, 60248),

Gene: Eaglehorse\_67 Start: 56743, Stop: 57276, Start Num: 44

Candidate Starts for Eaglehorse\_67:

(7, 56467), (Start: 15 @56542 has 3 MA's), (27, 56626), (30, 56653), (Start: 33 @56665 has 9 MA's), (35, 56671), (38, 56707), (39, 56710), (Start: 44 @56743 has 23 MA's), (Start: 45 @56752 has 8 MA's), (Start: 48 @56761 has 2 MA's), (51, 56794), (57, 56860), (61, 56908), (68, 56968), (71, 56986), (72, 57007), (74, 57031), (75, 57043), (85, 57097), (86, 57106), (92, 57160),

Gene: Faze9\_66 Start: 56891, Stop: 57415, Start Num: 45

Candidate Starts for Faze9\_66:

(7, 56606), (Start: 15 @56681 has 3 MA's), (27, 56765), (30, 56792), (Start: 33 @56804 has 9 MA's), (35, 56810), (38, 56846), (39, 56849), (Start: 44 @56882 has 23 MA's), (Start: 45 @56891 has 8 MA's), (Start: 48 @56900 has 2 MA's), (51, 56933), (57, 56999), (61, 57047), (68, 57107), (71, 57125), (72, 57146), (74, 57170), (75, 57182), (85, 57236), (86, 57245), (92, 57299),

Gene: Fortunato\_69 Start: 60068, Stop: 60652, Start Num: 33

Candidate Starts for Fortunato\_69:

(13, 59945), (Start: 15 @59951 has 3 MA's), (Start: 33 @60068 has 9 MA's), (Start: 49 @60185 has 2 MA's), (53, 60209), (54, 60218), (62, 60317), (64, 60323), (67, 60341), (70, 60383), (71, 60386), (74, 60431), (75, 60443), (78, 60464), (95, 60563), (97, 60578), (102, 60629),

Gene: Frederick\_68 Start: 60132, Stop: 60596, Start Num: 49

Candidate Starts for Frederick\_68:

(13, 59892), (Start: 15 @59898 has 3 MA's), (Start: 33 @60015 has 9 MA's), (Start: 49 @60132 has 2 MA's), (53, 60156), (54, 60165), (62, 60264), (64, 60270), (67, 60288), (70, 60330), (71, 60333), (74, 60378), (75, 60390), (95, 60507), (102, 60573),

Gene: FrenchFry\_68 Start: 56868, Stop: 57401, Start Num: 44

Candidate Starts for FrenchFry\_68:

(7, 56592), (Start: 15 @56667 has 3 MA's), (27, 56751), (30, 56778), (Start: 33 @56790 has 9 MA's), (35, 56796), (38, 56832), (39, 56835), (Start: 44 @56868 has 23 MA's), (Start: 45 @56877 has 8 MA's), (Start: 48 @56886 has 2 MA's), (51, 56919), (57, 56985), (61, 57033), (68, 57093), (71, 57111), (72, 57132), (74, 57156), (75, 57168), (85, 57222), (86, 57231), (92, 57285),

Gene: Glass\_68 Start: 56669, Stop: 57403, Start Num: 15

Candidate Starts for Glass\_68:

(7, 56594), (Start: 15 @56669 has 3 MA's), (27, 56753), (30, 56780), (Start: 33 @56792 has 9 MA's), (35, 56798), (38, 56834), (39, 56837), (42, 56849), (Start: 44 @56870 has 23 MA's), (Start: 45 @56879 has 8 MA's), (Start: 48 @56888 has 2 MA's), (51, 56921), (57, 56987), (61, 57035), (68, 57095), (71, 57113), (72, 57134), (74, 57158), (75, 57170), (85, 57224), (86, 57233), (92, 57287),

Gene: Godines\_68 Start: 57120, Stop: 57656, Start Num: 44

Candidate Starts for Godines\_68:

(7, 56844), (Start: 15 @56919 has 3 MA's), (27, 57003), (30, 57030), (Start: 33 @57042 has 9 MA's), (35, 57048), (38, 57084), (39, 57087), (40, 57093), (Start: 44 @57120 has 23 MA's), (Start: 45 @57129 has 8 MA's), (Start: 48 @57141 has 2 MA's), (51, 57174), (57, 57240), (61, 57288), (68, 57348), (71, 57366), (72, 57387), (74, 57411), (75, 57423), (85, 57477), (86, 57486), (92, 57540),

Gene: Hangman\_69 Start: 60214, Stop: 60795, Start Num: 33

Candidate Starts for Hangman\_69:

(13, 60091), (Start: 15 @60097 has 3 MA's), (Start: 33 @60214 has 9 MA's), (53, 60355), (54, 60364), (62, 60463), (64, 60469), (71, 60532), (74, 60577), (75, 60589), (95, 60706), (102, 60772),

Gene: Heath\_68 Start: 59862, Stop: 60422, Start Num: 36

Candidate Starts for Heath\_68:

(13, 59718), (Start: 15 @59724 has 3 MA's), (Start: 33 @59841 has 9 MA's), (Start: 36 @59862 has 6 MA's), (53, 59982), (54, 59991), (62, 60090), (64, 60096), (71, 60159), (74, 60204), (75, 60216), (95, 60333), (102, 60399),

Gene: Hedgerow\_67 Start: 56820, Stop: 57353, Start Num: 44

Candidate Starts for Hedgerow\_67:

(7, 56544), (Start: 15 @56619 has 3 MA's), (27, 56706), (30, 56733), (32, 56739), (Start: 33 @56742 has 9 MA's), (35, 56748), (38, 56784), (39, 56787), (Start: 44 @56820 has 23 MA's), (Start: 45



@56829 has 8 MA's), (Start: 48 @56838 has 2 MA's), (51, 56871), (57, 56937), (61, 56985), (68, 57045), (71, 57063), (72, 57084), (74, 57108), (75, 57120), (85, 57174), (86, 57183), (92, 57237), (98, 57282),

Gene: Holeinone\_67 Start: 56725, Stop: 57258, Start Num: 44

Candidate Starts for Holeinone\_67:

(7, 56449), (Start: 15 @56524 has 3 MA's), (27, 56608), (30, 56635), (Start: 33 @56647 has 9 MA's), (35, 56653), (38, 56689), (39, 56692), (Start: 44 @56725 has 23 MA's), (Start: 45 @56734 has 8 MA's), (Start: 48 @56743 has 2 MA's), (51, 56776), (57, 56842), (61, 56890), (68, 56950), (71, 56968), (72, 56989), (74, 57013), (75, 57025), (85, 57079), (86, 57088), (92, 57142),

Gene: Hydro\_69 Start: 60152, Stop: 60733, Start Num: 33

Candidate Starts for Hydro\_69:

(13, 60029), (Start: 15 @60035 has 3 MA's), (Start: 33 @60152 has 9 MA's), (Start: 49 @60269 has 2 MA's), (53, 60293), (54, 60302), (62, 60401), (64, 60407), (71, 60470), (74, 60515), (75, 60527), (95, 60644), (102, 60710),

Gene: Indlovu\_69 Start: 59915, Stop: 60454, Start Num: 43

Candidate Starts for Indlovu\_69:

(1, 59609), (3, 59615), (9, 59675), (12, 59714), (Start: 43 @59915 has 2 MA's), (50, 59963), (52, 59981), (56, 60038), (62, 60092), (66, 60107), (69, 60143), (70, 60152), (73, 60182), (74, 60200), (82, 60254), (83, 60266), (91, 60344),

Gene: ItsyBitsy1\_66 Start: 56958, Stop: 57494, Start Num: 44

Candidate Starts for ItsyBitsy1\_66:

(2, 56628), (7, 56682), (Start: 15 @56757 has 3 MA's), (25, 56835), (27, 56841), (30, 56868), (Start: 33 @56880 has 9 MA's), (35, 56886), (38, 56922), (39, 56925), (42, 56937), (Start: 44 @56958 has 23 MA's), (Start: 45 @56967 has 8 MA's), (Start: 48 @56979 has 2 MA's), (51, 57012), (57, 57078), (61, 57126), (68, 57186), (71, 57204), (72, 57225), (74, 57249), (75, 57261), (85, 57315), (86, 57324), (92, 57378), (98, 57423),

Gene: JAMaL\_68 Start: 60063, Stop: 60626, Start Num: 36

Candidate Starts for JAMaL\_68:

(13, 59919), (Start: 15 @59925 has 3 MA's), (23, 59979), (24, 59991), (Start: 33 @60042 has 9 MA's), (Start: 36 @60063 has 6 MA's), (53, 60183), (54, 60192), (62, 60291), (64, 60297), (67, 60315), (71, 60360), (74, 60405), (75, 60417), (86, 60480), (95, 60537), (97, 60552),

Gene: JaguarMi\_69 Start: 61329, Stop: 61889, Start Num: 36

Candidate Starts for JaguarMi\_69:

(13, 61182), (Start: 15 @61188 has 3 MA's), (24, 61254), (Start: 33 @61305 has 9 MA's), (Start: 36 @61329 has 6 MA's), (53, 61449), (54, 61458), (62, 61557), (64, 61563), (67, 61581), (70, 61623), (71, 61626), (74, 61671), (75, 61683), (78, 61704), (87, 61767), (89, 61776),

Gene: Kaleb\_68 Start: 56875, Stop: 57408, Start Num: 44

Candidate Starts for Kaleb\_68:

(7, 56599), (Start: 15 @56674 has 3 MA's), (27, 56758), (30, 56785), (Start: 33 @56797 has 9 MA's), (35, 56803), (38, 56839), (39, 56842), (Start: 44 @56875 has 23 MA's), (Start: 45 @56884 has 8 MA's), (Start: 48 @56893 has 2 MA's), (51, 56926), (57, 56992), (61, 57040), (68, 57100), (71, 57118), (72, 57139), (74, 57163), (75, 57175), (85, 57229), (86, 57238), (92, 57292),

Gene: Kheth\_67 Start: 56787, Stop: 57320, Start Num: 44

Candidate Starts for Kheth\_67:

(7, 56511), (Start: 15 @56586 has 3 MA's), (27, 56670), (30, 56697), (Start: 33 @56709 has 9 MA's), (35, 56715), (38, 56751), (39, 56754), (Start: 44 @56787 has 23 MA's), (Start: 45 @56796 has 8 MA's), (Start: 48 @56805 has 2 MA's), (51, 56838), (57, 56904), (61, 56952), (68, 57012), (71, 57030), (72, 57051), (74, 57075), (75, 57087), (85, 57141), (86, 57150), (92, 57204),

Gene: Lars\_68 Start: 56848, Stop: 57381, Start Num: 44

Candidate Starts for Lars\_68:

(7, 56572), (Start: 15 @56647 has 3 MA's), (27, 56731), (30, 56758), (Start: 33 @56770 has 9 MA's), (35, 56776), (38, 56812), (39, 56815), (42, 56827), (Start: 44 @56848 has 23 MA's), (Start: 45 @56857 has 8 MA's), (Start: 48 @56866 has 2 MA's), (51, 56899), (57, 56965), (61, 57013), (68, 57073), (71, 57091), (72, 57112), (74, 57136), (75, 57148), (85, 57202), (86, 57211), (92, 57265),

Gene: Laurie\_67 Start: 56525, Stop: 57058, Start Num: 44

Candidate Starts for Laurie\_67:

(7, 56249), (Start: 15 @56324 has 3 MA's), (27, 56411), (30, 56438), (32, 56444), (Start: 33 @56447 has 9 MA's), (35, 56453), (38, 56489), (39, 56492), (Start: 44 @56525 has 23 MA's), (Start: 45 @56534 has 8 MA's), (Start: 48 @56543 has 2 MA's), (51, 56576), (57, 56642), (61, 56690), (68, 56750), (71, 56768), (72, 56789), (74, 56813), (75, 56825), (85, 56879), (86, 56888), (92, 56942), (98, 56987),

Gene: Lephleur\_67 Start: 56710, Stop: 57243, Start Num: 44

Candidate Starts for Lephleur\_67:

(7, 56434), (Start: 15 @56509 has 3 MA's), (27, 56593), (30, 56620), (Start: 33 @56632 has 9 MA's), (35, 56638), (38, 56674), (39, 56677), (Start: 44 @56710 has 23 MA's), (Start: 45 @56719 has 8 MA's), (Start: 48 @56728 has 2 MA's), (51, 56761), (57, 56827), (61, 56875), (68, 56935), (71, 56953), (72, 56974), (74, 56998), (75, 57010), (85, 57064), (86, 57073), (92, 57127),

Gene: LizLemon\_67 Start: 56875, Stop: 57408, Start Num: 44

Candidate Starts for LizLemon\_67:

(7, 56599), (Start: 15 @56674 has 3 MA's), (27, 56758), (30, 56785), (Start: 33 @56797 has 9 MA's), (35, 56803), (38, 56839), (39, 56842), (42, 56854), (Start: 44 @56875 has 23 MA's), (Start: 45 @56884 has 8 MA's), (Start: 48 @56893 has 2 MA's), (51, 56926), (57, 56992), (61, 57040), (68, 57100), (71, 57118), (72, 57139), (74, 57163), (75, 57175), (85, 57229), (86, 57238), (92, 57292),

Gene: Lolalove\_70 Start: 60244, Stop: 60804, Start Num: 36

Candidate Starts for Lolalove\_70:

(13, 60100), (Start: 15 @60106 has 3 MA's), (Start: 33 @60223 has 9 MA's), (Start: 36 @60244 has 6 MA's), (53, 60364), (54, 60373), (62, 60472), (64, 60478), (71, 60541), (74, 60586), (75, 60598), (95, 60715), (96, 60727),

Gene: Magpie\_66 Start: 59929, Stop: 60492, Start Num: 36

Candidate Starts for Magpie\_66:

(13, 59785), (Start: 15 @59791 has 3 MA's), (Start: 33 @59908 has 9 MA's), (Start: 36 @59929 has 6 MA's), (53, 60049), (54, 60058), (62, 60157), (64, 60163), (67, 60181), (70, 60223), (71, 60226), (74, 60271), (75, 60283), (78, 60304), (91, 60382), (95, 60403), (97, 60418),

Gene: MasterPo\_68 Start: 56742, Stop: 57275, Start Num: 44

Candidate Starts for MasterPo\_68:

(7, 56466), (Start: 15 @56541 has 3 MA's), (27, 56625), (30, 56652), (Start: 33 @56664 has 9 MA's), (35, 56670), (38, 56706), (39, 56709), (Start: 44 @56742 has 23 MA's), (Start: 45 @56751 has 8 MA's), (Start: 48 @56760 has 2 MA's), (51, 56793), (57, 56859), (61, 56907), (68, 56967), (71, 56985), (72, 57006), (74, 57030), (75, 57042), (85, 57096), (86, 57105), (92, 57159),

Gene: Mithril\_68 Start: 60339, Stop: 60803, Start Num: 49

Candidate Starts for Mithril\_68:

(13, 60099), (Start: 15 @60105 has 3 MA's), (Start: 33 @60222 has 9 MA's), (Start: 49 @60339 has 2 MA's), (53, 60363), (54, 60372), (62, 60471), (64, 60477), (67, 60495), (71, 60540), (74, 60585), (75, 60597), (78, 60618), (87, 60681), (89, 60690), (95, 60714), (96, 60726),

Gene: Mudslide\_68 Start: 60243, Stop: 60824, Start Num: 33

Candidate Starts for Mudslide\_68:

(13, 60120), (Start: 15 @60126 has 3 MA's), (Start: 33 @60243 has 9 MA's), (53, 60384), (54, 60393), (62, 60492), (64, 60498), (71, 60561), (74, 60606), (75, 60618), (89, 60711), (95, 60735), (96, 60747),

Gene: Nanao\_67 Start: 59059, Stop: 59622, Start Num: 36

Candidate Starts for Nanao\_67:

(13, 58915), (Start: 15 @58921 has 3 MA's), (24, 58987), (Start: 33 @59038 has 9 MA's), (Start: 36 @59059 has 6 MA's), (53, 59179), (54, 59188), (62, 59287), (64, 59293), (67, 59311), (71, 59356), (74, 59401), (75, 59413), (95, 59533), (97, 59548),

Gene: Nigel\_66 Start: 58741, Stop: 59442, Start Num: 15

Candidate Starts for Nigel\_66:

(13, 58735), (Start: 15 @58741 has 3 MA's), (16, 58753), (22, 58786), (24, 58807), (Start: 33 @58858 has 9 MA's), (53, 58996), (54, 59005), (62, 59104), (67, 59128), (71, 59173), (74, 59218), (75, 59230), (79, 59254), (85, 59284), (86, 59293), (95, 59353), (97, 59368),

Gene: Opia\_68 Start: 56768, Stop: 57301, Start Num: 44

Candidate Starts for Opia\_68:

(7, 56492), (Start: 15 @56567 has 3 MA's), (27, 56651), (30, 56678), (Start: 33 @56690 has 9 MA's), (35, 56696), (38, 56732), (39, 56735), (Start: 44 @56768 has 23 MA's), (Start: 45 @56777 has 8 MA's), (Start: 48 @56786 has 2 MA's), (51, 56819), (57, 56885), (61, 56933), (68, 56993), (71, 57011), (72, 57032), (74, 57056), (75, 57068), (85, 57122), (86, 57131), (92, 57185),

Gene: PenguinLover67\_69 Start: 59425, Stop: 59871, Start Num: 48

Candidate Starts for PenguinLover67\_69:

(4, 59146), (9, 59191), (17, 59266), (20, 59278), (32, 59347), (Start: 43 @59398 has 2 MA's), (Start: 48 @59425 has 2 MA's), (50, 59446), (55, 59494), (56, 59521), (62, 59575), (65, 59587), (67, 59593), (73, 59656), (85, 59737), (98, 59809),

Gene: Phantasmagoria\_66 Start: 56757, Stop: 57290, Start Num: 44

Candidate Starts for Phantasmagoria\_66:

(7, 56481), (Start: 15 @56556 has 3 MA's), (27, 56640), (30, 56667), (Start: 33 @56679 has 9 MA's), (35, 56685), (38, 56721), (39, 56724), (Start: 44 @56757 has 23 MA's), (Start: 45 @56766 has 8 MA's), (Start: 48 @56775 has 2 MA's), (51, 56808), (57, 56874), (61, 56922), (64, 56934), (68, 56982), (71, 57000), (72, 57021), (74, 57045), (75, 57057), (85, 57111), (86, 57120), (92, 57174),

Gene: Poster\_66 Start: 59060, Stop: 59623, Start Num: 36

Candidate Starts for Poster\_66:

(13, 58916), (Start: 15 @58922 has 3 MA's), (24, 58988), (Start: 33 @59039 has 9 MA's), (Start: 36 @59060 has 6 MA's), (53, 59180), (54, 59189), (62, 59288), (64, 59294), (67, 59312), (71, 59357), (74, 59402), (75, 59414), (95, 59534), (97, 59549),

Gene: Prince\_67 Start: 60174, Stop: 60725, Start Num: 36

Candidate Starts for Prince\_67:

(13, 60030), (Start: 15 @60036 has 3 MA's), (Start: 33 @60153 has 9 MA's), (Start: 36 @60174 has 6 MA's), (Start: 49 @60270 has 2 MA's), (53, 60294), (54, 60303), (62, 60402), (64, 60408), (67, 60426),

(70, 60468), (71, 60471), (74, 60516), (75, 60528), (95, 60636),

Gene: Qyrzula\_61 Start: 56891, Stop: 57415, Start Num: 45

Candidate Starts for Qyrzula\_61:

(7, 56606), (Start: 15 @56681 has 3 MA's), (27, 56765), (30, 56792), (Start: 33 @56804 has 9 MA's), (35, 56810), (38, 56846), (39, 56849), (Start: 44 @56882 has 23 MA's), (Start: 45 @56891 has 8 MA's), (Start: 48 @56900 has 2 MA's), (51, 56933), (57, 56999), (61, 57047), (68, 57107), (71, 57125), (72, 57146), (74, 57170), (75, 57182), (85, 57236), (86, 57245), (90, 57296), (92, 57299),

Gene: RawrgerThat\_69 Start: 60046, Stop: 60630, Start Num: 33

Candidate Starts for RawrgerThat\_69:

(13, 59923), (Start: 15 @59929 has 3 MA's), (Start: 33 @60046 has 9 MA's), (Start: 49 @60163 has 2 MA's), (53, 60187), (54, 60196), (62, 60295), (64, 60301), (67, 60319), (70, 60361), (71, 60364), (74, 60409), (75, 60421), (78, 60442), (95, 60541), (97, 60556), (102, 60607),

Gene: Rhinoforte\_67 Start: 56795, Stop: 57328, Start Num: 44

Candidate Starts for Rhinoforte\_67:

(7, 56519), (Start: 15 @56594 has 3 MA's), (25, 56672), (27, 56678), (30, 56705), (Start: 33 @56717 has 9 MA's), (35, 56723), (38, 56759), (39, 56762), (Start: 44 @56795 has 23 MA's), (Start: 45 @56804 has 8 MA's), (Start: 48 @56813 has 2 MA's), (51, 56846), (57, 56912), (61, 56960), (68, 57020), (71, 57038), (72, 57059), (74, 57083), (75, 57095), (85, 57149), (86, 57158), (92, 57212),

Gene: Rosebush\_66 Start: 56870, Stop: 57394, Start Num: 45

Candidate Starts for Rosebush\_66:

(7, 56585), (Start: 15 @56660 has 3 MA's), (27, 56744), (30, 56771), (Start: 33 @56783 has 9 MA's), (35, 56789), (38, 56825), (39, 56828), (Start: 44 @56861 has 23 MA's), (Start: 45 @56870 has 8 MA's), (Start: 48 @56879 has 2 MA's), (51, 56912), (57, 56978), (61, 57026), (68, 57086), (71, 57104), (72, 57125), (74, 57149), (75, 57161), (85, 57215), (86, 57224), (90, 57275), (92, 57278),

Gene: Sabella\_67 Start: 56697, Stop: 57230, Start Num: 44

Candidate Starts for Sabella\_67:

(7, 56421), (Start: 15 @56496 has 3 MA's), (27, 56580), (30, 56607), (Start: 33 @56619 has 9 MA's), (35, 56625), (38, 56661), (39, 56664), (Start: 44 @56697 has 23 MA's), (Start: 45 @56706 has 8 MA's), (Start: 48 @56715 has 2 MA's), (51, 56748), (57, 56814), (61, 56862), (68, 56922), (71, 56940), (72, 56961), (74, 56985), (75, 56997), (85, 57051), (86, 57060), (92, 57114),

Gene: Saguaro\_67 Start: 58827, Stop: 59270, Start Num: 48

Candidate Starts for Saguaro\_67:

(6, 58491), (10, 58551), (11, 58569), (18, 58626), (28, 58695), (29, 58716), (Start: 48 @58827 has 2 MA's), (59, 58938), (60, 58944), (64, 58965), (65, 58977), (66, 58980), (69, 59016), (77, 59088), (81, 59112),

Gene: Stinger\_68 Start: 58864, Stop: 59568, Start Num: 15

Candidate Starts for Stinger\_68:

(Start: 15 @58864 has 3 MA's), (Start: 33 @58981 has 9 MA's), (53, 59122), (54, 59131), (62, 59230), (64, 59236), (67, 59254), (71, 59299), (74, 59344), (75, 59356), (93, 59473), (95, 59479), (97, 59494),

Gene: TA17A\_67 Start: 56700, Stop: 57236, Start Num: 44

Candidate Starts for TA17A\_67:

(7, 56424), (Start: 15 @56499 has 3 MA's), (27, 56583), (30, 56610), (Start: 33 @56622 has 9 MA's), (35, 56628), (37, 56661), (38, 56664), (39, 56667), (Start: 44 @56700 has 23 MA's), (Start: 45 @56709 has 8 MA's), (Start: 48 @56721 has 2 MA's), (51, 56754), (57, 56820), (61, 56868), (68, 56928), (71, 56946), (72, 56967), (74, 56991), (75, 57003), (85, 57057), (86, 57066), (92, 57120),

Gene: Tinciduntolum\_68 Start: 56873, Stop: 57397, Start Num: 45

Candidate Starts for Tinciduntolum\_68:

(7, 56588), (Start: 15 @56663 has 3 MA's), (27, 56747), (30, 56774), (Start: 33 @56786 has 9 MA's), (35, 56792), (38, 56828), (39, 56831), (Start: 44 @56864 has 23 MA's), (Start: 45 @56873 has 8 MA's), (Start: 48 @56882 has 2 MA's), (51, 56915), (57, 56981), (61, 57029), (68, 57089), (71, 57107), (72, 57128), (74, 57152), (75, 57164), (85, 57218), (86, 57227), (92, 57281),

Gene: Tres\_67 Start: 56718, Stop: 57251, Start Num: 44

Candidate Starts for Tres\_67:

(7, 56442), (Start: 15 @56517 has 3 MA's), (25, 56595), (27, 56601), (30, 56628), (Start: 33 @56640 has 9 MA's), (35, 56646), (38, 56682), (39, 56685), (Start: 44 @56718 has 23 MA's), (Start: 45 @56727 has 8 MA's), (Start: 48 @56736 has 2 MA's), (51, 56769), (57, 56835), (61, 56883), (68, 56943), (71, 56961), (72, 56982), (74, 57006), (75, 57018), (85, 57072), (86, 57081), (92, 57135),

Gene: VioletZ\_70 Start: 60156, Stop: 60719, Start Num: 33

Candidate Starts for VioletZ\_70:

(13, 60033), (Start: 15 @60039 has 3 MA's), (Start: 33 @60156 has 9 MA's), (53, 60297), (54, 60306), (67, 60429), (71, 60474), (74, 60519), (75, 60531), (80, 60561),

Gene: Waleliano\_68 Start: 60045, Stop: 60626, Start Num: 33

Candidate Starts for Waleliano\_68:

(13, 59922), (Start: 15 @59928 has 3 MA's), (Start: 33 @60045 has 9 MA's), (Start: 49 @60162 has 2 MA's), (53, 60186), (54, 60195), (62, 60294), (64, 60300), (71, 60363), (74, 60408), (75, 60420), (89, 60513), (95, 60537), (96, 60549),

Gene: West99\_67 Start: 56900, Stop: 57427, Start Num: 45

Candidate Starts for West99\_67:

(7, 56615), (Start: 15 @56690 has 3 MA's), (27, 56777), (30, 56804), (Start: 33 @56813 has 9 MA's), (35, 56819), (38, 56855), (39, 56858), (Start: 44 @56891 has 23 MA's), (Start: 45 @56900 has 8 MA's), (Start: 48 @56912 has 2 MA's), (51, 56945), (57, 57011), (61, 57059), (68, 57119), (71, 57137), (72, 57158), (74, 57182), (75, 57194), (85, 57248), (86, 57257), (92, 57311),

Gene: Zemanar\_68 Start: 59964, Stop: 60524, Start Num: 36

Candidate Starts for Zemanar\_68:

(13, 59820), (Start: 15 @59826 has 3 MA's), (Start: 33 @59943 has 9 MA's), (Start: 36 @59964 has 6 MA's), (53, 60084), (54, 60093), (62, 60192), (64, 60198), (71, 60261), (74, 60306), (75, 60318), (95, 60435), (102, 60501),