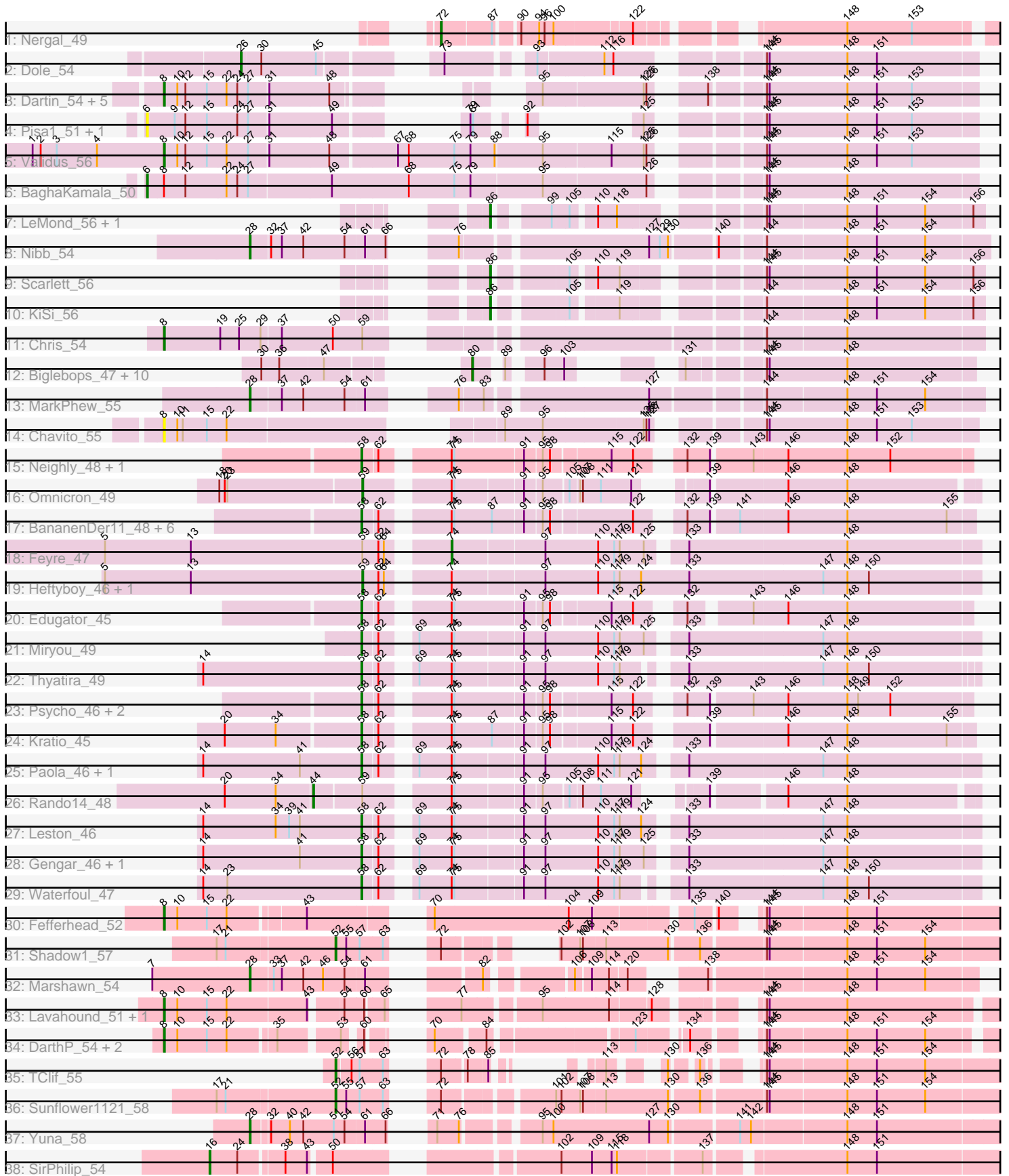


Pham 303340



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 303340 Report

This analysis was run 06/08/26 on database version 649.

Pham number 303340 has 70 members, 10 are drafts.

Phages represented in each track:

- Track 1 : Nergal\_49
- Track 2 : Dole\_54
- Track 3 : Dartin\_54, Shaobing\_54, Peanam\_54, Richo\_54, Niklas\_54, McMater\_54
- Track 4 : Pisa1\_51, Pisa4\_45
- Track 5 : Validus\_56
- Track 6 : BaghaKamala\_50
- Track 7 : LeMond\_56, Oscar\_56
- Track 8 : Nibb\_54
- Track 9 : Scarlett\_56
- Track 10 : KiSi\_56
- Track 11 : Chris\_54
- Track 12 : Biglebops\_47, LilPharaoh\_47, Nikao\_50, Trice\_47, Nutello\_47, Torres\_50, Enkosi\_49, SgtBeansprout\_47, Teejan\_49, Mdavu\_48, Amelie\_47
- Track 13 : MarkPhew\_55
- Track 14 : Chavito\_55
- Track 15 : Neighly\_48, Larva\_47
- Track 16 : Omnicron\_49
- Track 17 : BananenDer11\_48, ViviJ\_47, LilDirt\_47, DoubleChamp\_45, Collard\_46, Agent47\_48, InvictusManeo\_46
- Track 18 : Feyre\_47
- Track 19 : Heftyboy\_46, SoSeph\_46
- Track 20 : Edugator\_45
- Track 21 : Miryou\_49
- Track 22 : Thyatira\_49
- Track 23 : Psycho\_46, AlleyCat\_48, Dadosky\_48
- Track 24 : Kratio\_45
- Track 25 : Paola\_46, Guillsminger\_47
- Track 26 : Rando14\_48
- Track 27 : Leston\_46
- Track 28 : Gengar\_46, OkiRoe\_46
- Track 29 : Waterfoul\_47
- Track 30 : Fefferhead\_52
- Track 31 : Shadow1\_57
- Track 32 : Marshawn\_54
- Track 33 : Lavahound\_51, Amgine\_52
- Track 34 : DarthP\_54, Hammy\_54, Amohnition\_54
- Track 35 : TClif\_55

- Track 36 : Sunflower1121\_58
- Track 37 : Yuna\_58
- Track 38 : SirPhilip\_54

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

The start number called the most often in the published annotations is 58, it was called in 20 of the 60 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Agent47\_48, AlleyCat\_48, BananenDer11\_48, Collard\_46, Dadosky\_48, DoubleChamp\_45, Edugator\_45, Gengar\_46, Guillsminger\_47, InvictusManeo\_46, Kratio\_45, Larva\_47, Leston\_46, LilDirt\_47, Miryou\_49, Neighly\_48, OkiRoe\_46, Paola\_46, Psycho\_46, Thyatira\_49, ViviJ\_47, Waterfoul\_47,

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

- 

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

- Amelie\_47, Amgine\_52, Amohnition\_54, BaghaKamala\_50, Biglebops\_47, Chavito\_55, Chris\_54, DarthP\_54, Dartin\_54, Dole\_54, Enkosi\_49, Fefferhead\_52, Feyre\_47, Hammy\_54, Heftyboy\_46, KiSi\_56, Lavahound\_51, LeMond\_56, LilPharaoh\_47, MarkPhew\_55, Marshawn\_54, McMater\_54, Mdavu\_48, Nergal\_49, Nibb\_54, Nikao\_50, Niklas\_54, Nutello\_47, Omnicron\_49, Oscar\_56, Peanam\_54, Pisa1\_51, Pisa4\_45, Rando14\_48, Richo\_54, Scarlett\_56, SgtBeansprout\_47, Shadow1\_57, Shaobing\_54, SirPhilip\_54, SoSeph\_46, Sunflower1121\_58, TClif\_55, Teejan\_49, Torres\_50, Trice\_47, Validus\_56, Yuna\_58,

**Summary by start number:**

Start 6:

- Found in 3 of 70 ( 4.3% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BaghaKamala\_50 (K1), Pisa1\_51 (K1), Pisa4\_45 (K1),

Start 8:

- Found in 16 of 70 ( 22.9% ) of genes in pham
- Manual Annotations of this start: 11 of 60
- Called 93.8% of time when present
- Phage (with cluster) where this start called: Amgine\_52 (K6), Amohnition\_54 (K6), Chavito\_55 (K1), Chris\_54 (K1), DarthP\_54 (K6), Dartin\_54 (K1), Fefferhead\_52 (K6), Hammy\_54 (K6), Lavahound\_51 (K6), McMater\_54 (K1), Niklas\_54 (K1), Peanam\_54 (K1), Richo\_54 (K1), Shaobing\_54 (K1), Validus\_56 (K1),

Start 16:

- Found in 1 of 70 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 100.0% of time when present

- Phage (with cluster) where this start called: SirPhilip\_54 (K6),

#### Start 26:

- Found in 1 of 70 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Dole\_54 (K1),

#### Start 28:

- Found in 4 of 70 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 4 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: MarkPhew\_55 (K1), Marshawn\_54 (K6), Nibb\_54 (K1), Yuna\_58 (K6),

#### Start 44:

- Found in 1 of 70 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Rando14\_48 (K5),

#### Start 52:

- Found in 3 of 70 ( 4.3% ) of genes in pham
- Manual Annotations of this start: 3 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Shadow1\_57 (K6), Sunflower1121\_58 (K6), TClif\_55 (K6),

#### Start 58:

- Found in 22 of 70 ( 31.4% ) of genes in pham
- Manual Annotations of this start: 20 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Agent47\_48 (K5), AlleyCat\_48 (K5), BananenDer11\_48 (K5), Collard\_46 (K5), Dadosky\_48 (K5), DoubleChamp\_45 (K5), Edugator\_45 (K5), Gengar\_46 (K5), Guillsminger\_47 (K5), InvictusManeo\_46 (K5), Kratio\_45 (K5), Larva\_47 (K5), Leston\_46 (K5), LilDirt\_47 (K5), Miryou\_49 (K5), Neighly\_48 (K3), OkiRoe\_46 (K5), Paola\_46 (K5), Psycho\_46 (K5), Thyatira\_49 (K5), ViviJ\_47 (K5), Waterfoul\_47 (K5),

#### Start 59:

- Found in 6 of 70 ( 8.6% ) of genes in pham
- Manual Annotations of this start: 3 of 60
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Heftyboy\_46 (K5), Omnicron\_49 (K5), SoSeph\_46 (K5),

#### Start 72:

- Found in 4 of 70 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 25.0% of time when present
- Phage (with cluster) where this start called: Nergal\_49 (AG),

#### Start 74:

- Found in 27 of 70 ( 38.6% ) of genes in pham
- Manual Annotations of this start: 1 of 60
- Called 3.7% of time when present
- Phage (with cluster) where this start called: Feyre\_47 (K5),

Start 80:

- Found in 11 of 70 ( 15.7% ) of genes in pham
- Manual Annotations of this start: 9 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Amelie\_47 (K1), Binglebops\_47 (K1), Enkosi\_49 (K1), LilPharaoh\_47 (K1), Mdavu\_48 (K1), Nikao\_50 (K1), Nutello\_47 (K1), SgtBeansprout\_47 (K1), Teejan\_49 (K1), Torres\_50 (K1), Trice\_47 (K1),

Start 86:

- Found in 4 of 70 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 4 of 60
- Called 100.0% of time when present
- Phage (with cluster) where this start called: KiSi\_56 (K1), LeMond\_56 (K1), Oscar\_56 (K1), Scarlett\_56 (K1),

### **Summary by clusters:**

There are 5 clusters represented in this pham: AG, K3, K1, K6, K5,

Info for manual annotations of cluster AG:

- Start number 72 was manually annotated 1 time for cluster AG.

Info for manual annotations of cluster K1:

- Start number 6 was manually annotated 1 time for cluster K1.
- Start number 8 was manually annotated 5 times for cluster K1.
- Start number 26 was manually annotated 1 time for cluster K1.
- Start number 28 was manually annotated 2 times for cluster K1.
- Start number 80 was manually annotated 9 times for cluster K1.
- Start number 86 was manually annotated 4 times for cluster K1.

Info for manual annotations of cluster K5:

- Start number 44 was manually annotated 1 time for cluster K5.
- Start number 58 was manually annotated 20 times for cluster K5.
- Start number 59 was manually annotated 3 times for cluster K5.
- Start number 74 was manually annotated 1 time for cluster K5.

Info for manual annotations of cluster K6:

- Start number 8 was manually annotated 6 times for cluster K6.
- Start number 16 was manually annotated 1 time for cluster K6.
- Start number 28 was manually annotated 2 times for cluster K6.
- Start number 52 was manually annotated 3 times for cluster K6.

### **Gene Information:**

Gene: Agent47\_48 Start: 36423, Stop: 37028, Start Num: 58

Candidate Starts for Agent47\_48:

(Start: 58 @36423 has 20 MA's), (62, 36438), (Start: 74 @36498 has 1 MA's), (75, 36501), (87, 36543), (91, 36576), (95, 36594), (98, 36600), (122, 36684), (132, 36720), (139, 36744), (141, 36771), (146, 36822), (148, 36888), (155, 36999),

Gene: AlleyCat\_48 Start: 36277, Stop: 36879, Start Num: 58

Candidate Starts for AlleyCat\_48:

(Start: 58 @36277 has 20 MA's), (62, 36292), (Start: 74 @36352 has 1 MA's), (75, 36355), (91, 36430), (95, 36448), (98, 36454), (115, 36514), (122, 36538), (132, 36574), (139, 36598), (143, 36640), (146, 36676), (148, 36742), (149, 36754), (152, 36790),

Gene: Amelie\_47 Start: 37306, Stop: 37731, Start Num: 80

Candidate Starts for Amelie\_47:

(30, 37171), (36, 37189), (47, 37234), (Start: 80 @37306 has 9 MA's), (89, 37327), (96, 37354), (103, 37375), (131, 37429), (144, 37501), (145, 37504), (148, 37591),

Gene: Amgine\_52 Start: 38804, Stop: 39586, Start Num: 8

Candidate Starts for Amgine\_52:

(Start: 8 @38804 has 11 MA's), (10, 38819), (15, 38852), (22, 38873), (43, 38960), (54, 38990), (60, 39011), (65, 39029), (77, 39071), (95, 39146), (114, 39218), (128, 39260), (144, 39341), (145, 39344), (148, 39431),

Gene: Amohnition\_54 Start: 38811, Stop: 39545, Start Num: 8

Candidate Starts for Amohnition\_54:

(Start: 8 @38811 has 11 MA's), (10, 38826), (15, 38859), (22, 38880), (35, 38928), (53, 38988), (60, 39003), (70, 39027), (84, 39075), (123, 39213), (134, 39255), (144, 39306), (145, 39309), (148, 39393), (151, 39426), (154, 39480),

Gene: BaghaKamala\_50 Start: 37051, Stop: 37917, Start Num: 6

Candidate Starts for BaghaKamala\_50:

(Start: 6 @37051 has 1 MA's), (Start: 8 @37069 has 11 MA's), (12, 37093), (22, 37138), (24, 37150), (27, 37162), (49, 37252), (68, 37336), (75, 37387), (79, 37405), (95, 37483), (126, 37594), (144, 37684), (145, 37687), (148, 37774),

Gene: BananenDer11\_48 Start: 36384, Stop: 36989, Start Num: 58

Candidate Starts for BananenDer11\_48:

(Start: 58 @36384 has 20 MA's), (62, 36399), (Start: 74 @36459 has 1 MA's), (75, 36462), (87, 36504), (91, 36537), (95, 36555), (98, 36561), (122, 36645), (132, 36681), (139, 36705), (141, 36732), (146, 36783), (148, 36849), (155, 36960),

Gene: Biglebops\_47 Start: 37306, Stop: 37731, Start Num: 80

Candidate Starts for Biglebops\_47:

(30, 37171), (36, 37189), (47, 37234), (Start: 80 @37306 has 9 MA's), (89, 37327), (96, 37354), (103, 37375), (131, 37429), (144, 37501), (145, 37504), (148, 37591),

Gene: Chavito\_55 Start: 39204, Stop: 39977, Start Num: 8

Candidate Starts for Chavito\_55:

(Start: 8 @39204 has 11 MA's), (10, 39219), (11, 39225), (15, 39252), (22, 39273), (89, 39498), (95, 39540), (125, 39648), (126, 39651), (127, 39654), (144, 39744), (145, 39747), (148, 39834), (151, 39867), (153, 39906),

Gene: Chris\_54 Start: 38558, Stop: 39373, Start Num: 8

Candidate Starts for Chris\_54:

(Start: 8 @38558 has 11 MA's), (19, 38618), (25, 38639), (29, 38663), (37, 38684), (50, 38741), (Start: 59 @38774 has 3 MA's), (144, 39137), (148, 39224),

Gene: Collard\_46 Start: 36384, Stop: 36989, Start Num: 58

Candidate Starts for Collard\_46:

(Start: 58 @36384 has 20 MA's), (62, 36399), (Start: 74 @36459 has 1 MA's), (75, 36462), (87, 36504), (91, 36537), (95, 36555), (98, 36561), (122, 36645), (132, 36681), (139, 36705), (141, 36732), (146, 36783), (148, 36849), (155, 36960),

Gene: Dadosky\_48 Start: 36279, Stop: 36881, Start Num: 58

Candidate Starts for Dadosky\_48:

(Start: 58 @36279 has 20 MA's), (62, 36294), (Start: 74 @36354 has 1 MA's), (75, 36357), (91, 36432), (95, 36450), (98, 36456), (115, 36516), (122, 36540), (132, 36576), (139, 36600), (143, 36642), (146, 36678), (148, 36744), (149, 36756), (152, 36792),

Gene: DarthP\_54 Start: 38695, Stop: 39429, Start Num: 8

Candidate Starts for DarthP\_54:

(Start: 8 @38695 has 11 MA's), (10, 38710), (15, 38743), (22, 38764), (35, 38812), (53, 38872), (60, 38887), (70, 38911), (84, 38959), (123, 39097), (134, 39139), (144, 39190), (145, 39193), (148, 39277), (151, 39310), (154, 39364),

Gene: Dartin\_54 Start: 38545, Stop: 39252, Start Num: 8

Candidate Starts for Dartin\_54:

(Start: 8 @38545 has 11 MA's), (10, 38560), (12, 38569), (15, 38593), (22, 38614), (24, 38626), (27, 38638), (31, 38659), (48, 38725), (95, 38818), (125, 38926), (126, 38929), (138, 38968), (144, 39019), (145, 39022), (148, 39109), (151, 39142), (153, 39181),

Gene: Dole\_54 Start: 38618, Stop: 39307, Start Num: 26

Candidate Starts for Dole\_54:

(Start: 26 @38618 has 1 MA's), (30, 38639), (45, 38699), (73, 38792), (93, 38870), (112, 38939), (116, 38948), (144, 39074), (145, 39077), (148, 39164), (151, 39197),

Gene: DoubleChamp\_45 Start: 36384, Stop: 36989, Start Num: 58

Candidate Starts for DoubleChamp\_45:

(Start: 58 @36384 has 20 MA's), (62, 36399), (Start: 74 @36459 has 1 MA's), (75, 36462), (87, 36504), (91, 36537), (95, 36555), (98, 36561), (122, 36645), (132, 36681), (139, 36705), (141, 36732), (146, 36783), (148, 36849), (155, 36960),

Gene: Edugator\_45 Start: 36704, Stop: 37297, Start Num: 58

Candidate Starts for Edugator\_45:

(Start: 58 @36704 has 20 MA's), (62, 36719), (Start: 74 @36779 has 1 MA's), (75, 36782), (91, 36857), (95, 36875), (98, 36881), (115, 36941), (122, 36965), (132, 37001), (143, 37058), (146, 37094), (148, 37160),

Gene: Enkosi\_49 Start: 39919, Stop: 40344, Start Num: 80

Candidate Starts for Enkosi\_49:

(30, 39784), (36, 39802), (47, 39847), (Start: 80 @39919 has 9 MA's), (89, 39940), (96, 39967), (103, 39988), (131, 40042), (144, 40114), (145, 40117), (148, 40204),

Gene: Fefferhead\_52 Start: 37942, Stop: 38751, Start Num: 8

Candidate Starts for Fefferhead\_52:

(Start: 8 @37942 has 11 MA's), (10, 37957), (15, 37990), (22, 38011), (43, 38089), (70, 38182), (104, 38329), (109, 38353), (135, 38449), (140, 38470), (144, 38497), (145, 38500), (148, 38584), (151,

38617),

Gene: Feyre\_47 Start: 37611, Stop: 38171, Start Num: 74

Candidate Starts for Feyre\_47:

(5, 37245), (13, 37341), (Start: 59 @37533 has 3 MA's), (62, 37551), (64, 37557), (Start: 74 @37611 has 1 MA's), (97, 37710), (110, 37767), (117, 37785), (119, 37791), (125, 37818), (133, 37851), (148, 38025),

Gene: Gengar\_46 Start: 36147, Stop: 36782, Start Num: 58

Candidate Starts for Gengar\_46:

(14, 35970), (41, 36078), (Start: 58 @36147 has 20 MA's), (62, 36162), (69, 36186), (Start: 74 @36222 has 1 MA's), (75, 36225), (91, 36297), (97, 36321), (110, 36378), (117, 36396), (119, 36402), (125, 36429), (133, 36462), (147, 36609), (148, 36636),

Gene: Guillsminger\_47 Start: 36118, Stop: 36753, Start Num: 58

Candidate Starts for Guillsminger\_47:

(14, 35941), (41, 36049), (Start: 58 @36118 has 20 MA's), (62, 36133), (69, 36157), (Start: 74 @36193 has 1 MA's), (75, 36196), (91, 36268), (97, 36292), (110, 36349), (117, 36367), (119, 36373), (124, 36397), (133, 36433), (147, 36580), (148, 36607),

Gene: Hammy\_54 Start: 38683, Stop: 39417, Start Num: 8

Candidate Starts for Hammy\_54:

(Start: 8 @38683 has 11 MA's), (10, 38698), (15, 38731), (22, 38752), (35, 38800), (53, 38860), (60, 38875), (70, 38899), (84, 38947), (123, 39085), (134, 39127), (144, 39178), (145, 39181), (148, 39265), (151, 39298), (154, 39352),

Gene: Heftyboy\_46 Start: 36269, Stop: 36925, Start Num: 59

Candidate Starts for Heftyboy\_46:

(5, 35981), (13, 36077), (Start: 59 @36269 has 3 MA's), (62, 36287), (64, 36293), (Start: 74 @36347 has 1 MA's), (97, 36446), (110, 36503), (117, 36521), (119, 36527), (124, 36551), (133, 36605), (147, 36752), (148, 36779), (150, 36803),

Gene: InvictusManeo\_46 Start: 36427, Stop: 37032, Start Num: 58

Candidate Starts for InvictusManeo\_46:

(Start: 58 @36427 has 20 MA's), (62, 36442), (Start: 74 @36502 has 1 MA's), (75, 36505), (87, 36547), (91, 36580), (95, 36598), (98, 36604), (122, 36688), (132, 36724), (139, 36748), (141, 36775), (146, 36826), (148, 36892), (155, 37003),

Gene: KiSi\_56 Start: 38953, Stop: 39420, Start Num: 86

Candidate Starts for KiSi\_56:

(Start: 86 @38953 has 4 MA's), (105, 39016), (119, 39061), (144, 39184), (148, 39271), (151, 39304), (154, 39358), (156, 39409),

Gene: Kratio\_45 Start: 35977, Stop: 36582, Start Num: 58

Candidate Starts for Kratio\_45:

(20, 35833), (34, 35890), (Start: 58 @35977 has 20 MA's), (62, 35992), (Start: 74 @36052 has 1 MA's), (75, 36055), (87, 36097), (91, 36130), (95, 36148), (98, 36154), (115, 36214), (122, 36238), (139, 36298), (146, 36376), (148, 36442), (155, 36553),

Gene: Larva\_47 Start: 36146, Stop: 36748, Start Num: 58

Candidate Starts for Larva\_47:

(Start: 58 @36146 has 20 MA's), (62, 36161), (Start: 74 @36221 has 1 MA's), (75, 36224), (91, 36299), (95, 36317), (98, 36323), (115, 36383), (122, 36407), (132, 36443), (139, 36467), (143, 36509), (146,

36545), (148, 36611), (152, 36659),

Gene: Lavahound\_51 Start: 38925, Stop: 39707, Start Num: 8

Candidate Starts for Lavahound\_51:

(Start: 8 @38925 has 11 MA's), (10, 38940), (15, 38973), (22, 38994), (43, 39081), (54, 39111), (60, 39132), (65, 39150), (77, 39192), (95, 39267), (114, 39339), (128, 39381), (144, 39462), (145, 39465), (148, 39552),

Gene: LeMond\_56 Start: 38937, Stop: 39401, Start Num: 86

Candidate Starts for LeMond\_56:

(Start: 86 @38937 has 4 MA's), (99, 38982), (105, 38997), (110, 39018), (118, 39039), (144, 39165), (145, 39168), (148, 39252), (151, 39285), (154, 39339), (156, 39390),

Gene: Leston\_46 Start: 36247, Stop: 36882, Start Num: 58

Candidate Starts for Leston\_46:

(14, 36070), (34, 36151), (39, 36166), (41, 36178), (Start: 58 @36247 has 20 MA's), (62, 36262), (69, 36286), (Start: 74 @36322 has 1 MA's), (75, 36325), (91, 36397), (97, 36421), (110, 36478), (117, 36496), (119, 36502), (124, 36526), (133, 36562), (147, 36709), (148, 36736),

Gene: LilDirt\_47 Start: 36185, Stop: 36790, Start Num: 58

Candidate Starts for LilDirt\_47:

(Start: 58 @36185 has 20 MA's), (62, 36200), (Start: 74 @36260 has 1 MA's), (75, 36263), (87, 36305), (91, 36338), (95, 36356), (98, 36362), (122, 36446), (132, 36482), (139, 36506), (141, 36533), (146, 36584), (148, 36650), (155, 36761),

Gene: LilPharaoh\_47 Start: 37034, Stop: 37459, Start Num: 80

Candidate Starts for LilPharaoh\_47:

(30, 36899), (36, 36917), (47, 36962), (Start: 80 @37034 has 9 MA's), (89, 37055), (96, 37082), (103, 37103), (131, 37157), (144, 37229), (145, 37232), (148, 37319),

Gene: MarkPhew\_55 Start: 38390, Stop: 39106, Start Num: 28

Candidate Starts for MarkPhew\_55:

(Start: 28 @38390 has 4 MA's), (37, 38423), (42, 38447), (54, 38492), (61, 38513), (76, 38570), (83, 38594), (127, 38759), (144, 38870), (148, 38957), (151, 38990), (154, 39044),

Gene: Marshawn\_54 Start: 38519, Stop: 39190, Start Num: 28

Candidate Starts for Marshawn\_54:

(7, 38411), (Start: 28 @38519 has 4 MA's), (33, 38543), (37, 38552), (42, 38576), (46, 38597), (54, 38621), (61, 38642), (82, 38723), (106, 38801), (109, 38816), (114, 38834), (120, 38852), (138, 38903), (148, 39047), (151, 39080), (154, 39134),

Gene: McMater\_54 Start: 38545, Stop: 39252, Start Num: 8

Candidate Starts for McMater\_54:

(Start: 8 @38545 has 11 MA's), (10, 38560), (12, 38569), (15, 38593), (22, 38614), (24, 38626), (27, 38638), (31, 38659), (48, 38725), (95, 38818), (125, 38926), (126, 38929), (138, 38968), (144, 39019), (145, 39022), (148, 39109), (151, 39142), (153, 39181),

Gene: Mdavu\_48 Start: 37295, Stop: 37720, Start Num: 80

Candidate Starts for Mdavu\_48:

(30, 37160), (36, 37178), (47, 37223), (Start: 80 @37295 has 9 MA's), (89, 37316), (96, 37343), (103, 37364), (131, 37418), (144, 37490), (145, 37493), (148, 37580),

Gene: Miryou\_49 Start: 38449, Stop: 39084, Start Num: 58

Candidate Starts for Miryou\_49:

(Start: 58 @38449 has 20 MA's), (62, 38464), (69, 38488), (Start: 74 @38524 has 1 MA's), (75, 38527), (91, 38599), (97, 38623), (110, 38680), (117, 38698), (119, 38704), (125, 38731), (133, 38764), (147, 38911), (148, 38938),

Gene: Neighly\_48 Start: 36145, Stop: 36747, Start Num: 58

Candidate Starts for Neighly\_48:

(Start: 58 @36145 has 20 MA's), (62, 36160), (Start: 74 @36220 has 1 MA's), (75, 36223), (91, 36298), (95, 36316), (98, 36322), (115, 36382), (122, 36406), (132, 36442), (139, 36466), (143, 36508), (146, 36544), (148, 36610), (152, 36658),

Gene: Nergal\_49 Start: 36269, Stop: 36790, Start Num: 72

Candidate Starts for Nergal\_49:

(Start: 72 @36269 has 1 MA's), (87, 36323), (90, 36344), (94, 36362), (96, 36368), (100, 36377), (122, 36455), (148, 36641), (153, 36713),

Gene: Nibb\_54 Start: 38079, Stop: 38801, Start Num: 28

Candidate Starts for Nibb\_54:

(Start: 28 @38079 has 4 MA's), (32, 38100), (37, 38112), (42, 38136), (54, 38181), (61, 38202), (66, 38223), (76, 38259), (127, 38448), (129, 38460), (130, 38469), (140, 38514), (144, 38559), (148, 38646), (151, 38679), (154, 38733),

Gene: Nikao\_50 Start: 39919, Stop: 40344, Start Num: 80

Candidate Starts for Nikao\_50:

(30, 39784), (36, 39802), (47, 39847), (Start: 80 @39919 has 9 MA's), (89, 39940), (96, 39967), (103, 39988), (131, 40042), (144, 40114), (145, 40117), (148, 40204),

Gene: Niklas\_54 Start: 38606, Stop: 39313, Start Num: 8

Candidate Starts for Niklas\_54:

(Start: 8 @38606 has 11 MA's), (10, 38621), (12, 38630), (15, 38654), (22, 38675), (24, 38687), (27, 38699), (31, 38720), (48, 38786), (95, 38879), (125, 38987), (126, 38990), (138, 39029), (144, 39080), (145, 39083), (148, 39170), (151, 39203), (153, 39242),

Gene: Nutello\_47 Start: 37306, Stop: 37731, Start Num: 80

Candidate Starts for Nutello\_47:

(30, 37171), (36, 37189), (47, 37234), (Start: 80 @37306 has 9 MA's), (89, 37327), (96, 37354), (103, 37375), (131, 37429), (144, 37501), (145, 37504), (148, 37591),

Gene: OkiRoe\_46 Start: 36120, Stop: 36755, Start Num: 58

Candidate Starts for OkiRoe\_46:

(14, 35943), (41, 36051), (Start: 58 @36120 has 20 MA's), (62, 36135), (69, 36159), (Start: 74 @36195 has 1 MA's), (75, 36198), (91, 36270), (97, 36294), (110, 36351), (117, 36369), (119, 36375), (125, 36402), (133, 36435), (147, 36582), (148, 36609),

Gene: Omnicron\_49 Start: 35732, Stop: 36313, Start Num: 59

Candidate Starts for Omnicron\_49:

(18, 35576), (20, 35582), (23, 35585), (Start: 59 @35732 has 3 MA's), (Start: 74 @35810 has 1 MA's), (75, 35813), (91, 35885), (95, 35903), (105, 35927), (107, 35936), (108, 35939), (111, 35957), (121, 35990), (139, 36032), (146, 36110), (148, 36176),

Gene: Oscar\_56 Start: 38839, Stop: 39306, Start Num: 86

Candidate Starts for Oscar\_56:

(Start: 86 @38839 has 4 MA's), (99, 38887), (105, 38902), (110, 38923), (118, 38944), (144, 39070), (145, 39073), (148, 39157), (151, 39190), (154, 39244), (156, 39295),

Gene: Paola\_46 Start: 36118, Stop: 36753, Start Num: 58

Candidate Starts for Paola\_46:

(14, 35941), (41, 36049), (Start: 58 @36118 has 20 MA's), (62, 36133), (69, 36157), (Start: 74 @36193 has 1 MA's), (75, 36196), (91, 36268), (97, 36292), (110, 36349), (117, 36367), (119, 36373), (124, 36397), (133, 36433), (147, 36580), (148, 36607),

Gene: Peanam\_54 Start: 38564, Stop: 39271, Start Num: 8

Candidate Starts for Peanam\_54:

(Start: 8 @38564 has 11 MA's), (10, 38579), (12, 38588), (15, 38612), (22, 38633), (24, 38645), (27, 38657), (31, 38678), (48, 38744), (95, 38837), (125, 38945), (126, 38948), (138, 38987), (144, 39038), (145, 39041), (148, 39128), (151, 39161), (153, 39200),

Gene: Pisa1\_51 Start: 38887, Stop: 39528, Start Num: 6

Candidate Starts for Pisa1\_51:

(Start: 6 @38887 has 1 MA's), (9, 38917), (12, 38929), (15, 38953), (24, 38986), (27, 38998), (31, 39019), (49, 39088), (79, 39148), (81, 39151), (92, 39178), (125, 39202), (144, 39295), (145, 39298), (148, 39385), (151, 39418), (153, 39457),

Gene: Pisa4\_45 Start: 34256, Stop: 34897, Start Num: 6

Candidate Starts for Pisa4\_45:

(Start: 6 @34256 has 1 MA's), (9, 34286), (12, 34298), (15, 34322), (24, 34355), (27, 34367), (31, 34388), (49, 34457), (79, 34517), (81, 34520), (92, 34547), (125, 34571), (144, 34664), (145, 34667), (148, 34754), (151, 34787), (153, 34826),

Gene: Psycho\_46 Start: 36276, Stop: 36878, Start Num: 58

Candidate Starts for Psycho\_46:

(Start: 58 @36276 has 20 MA's), (62, 36291), (Start: 74 @36351 has 1 MA's), (75, 36354), (91, 36429), (95, 36447), (98, 36453), (115, 36513), (122, 36537), (132, 36573), (139, 36597), (143, 36639), (146, 36675), (148, 36741), (149, 36753), (152, 36789),

Gene: Rando14\_48 Start: 35246, Stop: 35872, Start Num: 44

Candidate Starts for Rando14\_48:

(20, 35150), (34, 35207), (Start: 44 @35246 has 1 MA's), (Start: 59 @35297 has 3 MA's), (Start: 74 @35375 has 1 MA's), (75, 35378), (91, 35450), (95, 35468), (105, 35492), (108, 35504), (111, 35522), (121, 35555), (139, 35597), (146, 35669), (148, 35735),

Gene: Richo\_54 Start: 38545, Stop: 39252, Start Num: 8

Candidate Starts for Richo\_54:

(Start: 8 @38545 has 11 MA's), (10, 38560), (12, 38569), (15, 38593), (22, 38614), (24, 38626), (27, 38638), (31, 38659), (48, 38725), (95, 38818), (125, 38926), (126, 38929), (138, 38968), (144, 39019), (145, 39022), (148, 39109), (151, 39142), (153, 39181),

Gene: Scarlett\_56 Start: 38831, Stop: 39301, Start Num: 86

Candidate Starts for Scarlett\_56:

(Start: 86 @38831 has 4 MA's), (105, 38897), (110, 38918), (119, 38942), (144, 39065), (145, 39068), (148, 39152), (151, 39185), (154, 39239), (156, 39290),

Gene: SgtBeansprout\_47 Start: 37306, Stop: 37731, Start Num: 80

Candidate Starts for SgtBeansprout\_47:

(30, 37171), (36, 37189), (47, 37234), (Start: 80 @37306 has 9 MA's), (89, 37327), (96, 37354), (103, 37375), (131, 37429), (144, 37501), (145, 37504), (148, 37591),

Gene: Shadow1\_57 Start: 38538, Stop: 39143, Start Num: 52

Candidate Starts for Shadow1\_57:

(17, 38412), (21, 38421), (Start: 52 @38538 has 3 MA's), (55, 38550), (57, 38565), (63, 38589), (Start: 72 @38610 has 1 MA's), (102, 38676), (107, 38697), (108, 38700), (113, 38724), (130, 38793), (136, 38823), (144, 38889), (145, 38892), (148, 38976), (151, 39009), (154, 39063),

Gene: Shaobing\_54 Start: 38582, Stop: 39289, Start Num: 8

Candidate Starts for Shaobing\_54:

(Start: 8 @38582 has 11 MA's), (10, 38597), (12, 38606), (15, 38630), (22, 38651), (24, 38663), (27, 38675), (31, 38696), (48, 38762), (95, 38855), (125, 38963), (126, 38966), (138, 39005), (144, 39056), (145, 39059), (148, 39146), (151, 39179), (153, 39218),

Gene: SirPhilip\_54 Start: 38933, Stop: 39697, Start Num: 16

Candidate Starts for SirPhilip\_54:

(Start: 16 @38933 has 1 MA's), (24, 38963), (38, 39008), (43, 39032), (50, 39053), (102, 39245), (109, 39278), (115, 39299), (118, 39305), (137, 39392), (148, 39530), (151, 39563),

Gene: SoSeph\_46 Start: 36269, Stop: 36925, Start Num: 59

Candidate Starts for SoSeph\_46:

(5, 35981), (13, 36077), (Start: 59 @36269 has 3 MA's), (62, 36287), (64, 36293), (Start: 74 @36347 has 1 MA's), (97, 36446), (110, 36503), (117, 36521), (119, 36527), (124, 36551), (133, 36605), (147, 36752), (148, 36779), (150, 36803),

Gene: Sunflower1121\_58 Start: 38639, Stop: 39289, Start Num: 52

Candidate Starts for Sunflower1121\_58:

(17, 38513), (21, 38522), (Start: 52 @38639 has 3 MA's), (55, 38651), (57, 38666), (63, 38690), (Start: 72 @38711 has 1 MA's), (101, 38816), (102, 38822), (107, 38843), (108, 38846), (113, 38870), (130, 38939), (136, 38969), (144, 39035), (145, 39038), (148, 39122), (151, 39155), (154, 39209),

Gene: TClif\_55 Start: 38682, Stop: 39194, Start Num: 52

Candidate Starts for TClif\_55:

(Start: 52 @38682 has 3 MA's), (56, 38697), (57, 38706), (63, 38730), (Start: 72 @38751 has 1 MA's), (78, 38775), (85, 38796), (113, 38832), (130, 38868), (136, 38889), (144, 38925), (145, 38928), (148, 39012), (151, 39045), (154, 39099),

Gene: Teejan\_49 Start: 39919, Stop: 40344, Start Num: 80

Candidate Starts for Teejan\_49:

(30, 39784), (36, 39802), (47, 39847), (Start: 80 @39919 has 9 MA's), (89, 39940), (96, 39967), (103, 39988), (131, 40042), (144, 40114), (145, 40117), (148, 40204),

Gene: Thyatira\_49 Start: 38470, Stop: 39090, Start Num: 58

Candidate Starts for Thyatira\_49:

(14, 38293), (Start: 58 @38470 has 20 MA's), (62, 38485), (69, 38509), (Start: 74 @38545 has 1 MA's), (75, 38548), (91, 38620), (97, 38644), (110, 38701), (117, 38719), (119, 38725), (133, 38776), (147, 38923), (148, 38950), (150, 38974),

Gene: Torres\_50 Start: 39920, Stop: 40345, Start Num: 80

Candidate Starts for Torres\_50:

(30, 39785), (36, 39803), (47, 39848), (Start: 80 @39920 has 9 MA's), (89, 39941), (96, 39968), (103, 39989), (131, 40043), (144, 40115), (145, 40118), (148, 40205),

Gene: Trice\_47 Start: 37307, Stop: 37732, Start Num: 80

Candidate Starts for Trice\_47:

(30, 37172), (36, 37190), (47, 37235), (Start: 80 @37307 has 9 MA's), (89, 37328), (96, 37355), (103, 37376), (131, 37430), (144, 37502), (145, 37505), (148, 37592),

Gene: Validus\_56 Start: 38620, Stop: 39468, Start Num: 8

Candidate Starts for Validus\_56:

(1, 38473), (2, 38482), (3, 38500), (4, 38545), (Start: 8 @38620 has 11 MA's), (10, 38635), (12, 38644), (15, 38668), (22, 38689), (27, 38713), (31, 38734), (48, 38800), (67, 38869), (68, 38881), (75, 38932), (79, 38950), (88, 38977), (95, 39028), (115, 39100), (125, 39136), (126, 39139), (144, 39232), (145, 39235), (148, 39322), (151, 39355), (153, 39394),

Gene: ViviJ\_47 Start: 36184, Stop: 36789, Start Num: 58

Candidate Starts for ViviJ\_47:

(Start: 58 @36184 has 20 MA's), (62, 36199), (Start: 74 @36259 has 1 MA's), (75, 36262), (87, 36304), (91, 36337), (95, 36355), (98, 36361), (122, 36445), (132, 36481), (139, 36505), (141, 36532), (146, 36583), (148, 36649), (155, 36760),

Gene: Waterfoul\_47 Start: 36361, Stop: 36987, Start Num: 58

Candidate Starts for Waterfoul\_47:

(14, 36184), (23, 36211), (Start: 58 @36361 has 20 MA's), (62, 36376), (69, 36400), (Start: 74 @36436 has 1 MA's), (75, 36439), (91, 36511), (97, 36535), (110, 36592), (117, 36610), (119, 36616), (133, 36667), (147, 36814), (148, 36841), (150, 36865),

Gene: Yuna\_58 Start: 39426, Stop: 40163, Start Num: 28

Candidate Starts for Yuna\_58:

(Start: 28 @39426 has 4 MA's), (32, 39444), (40, 39465), (42, 39480), (51, 39513), (54, 39525), (61, 39546), (66, 39567), (71, 39579), (76, 39603), (95, 39672), (100, 39684), (127, 39789), (130, 39810), (141, 39879), (142, 39891), (148, 39993), (151, 40026),