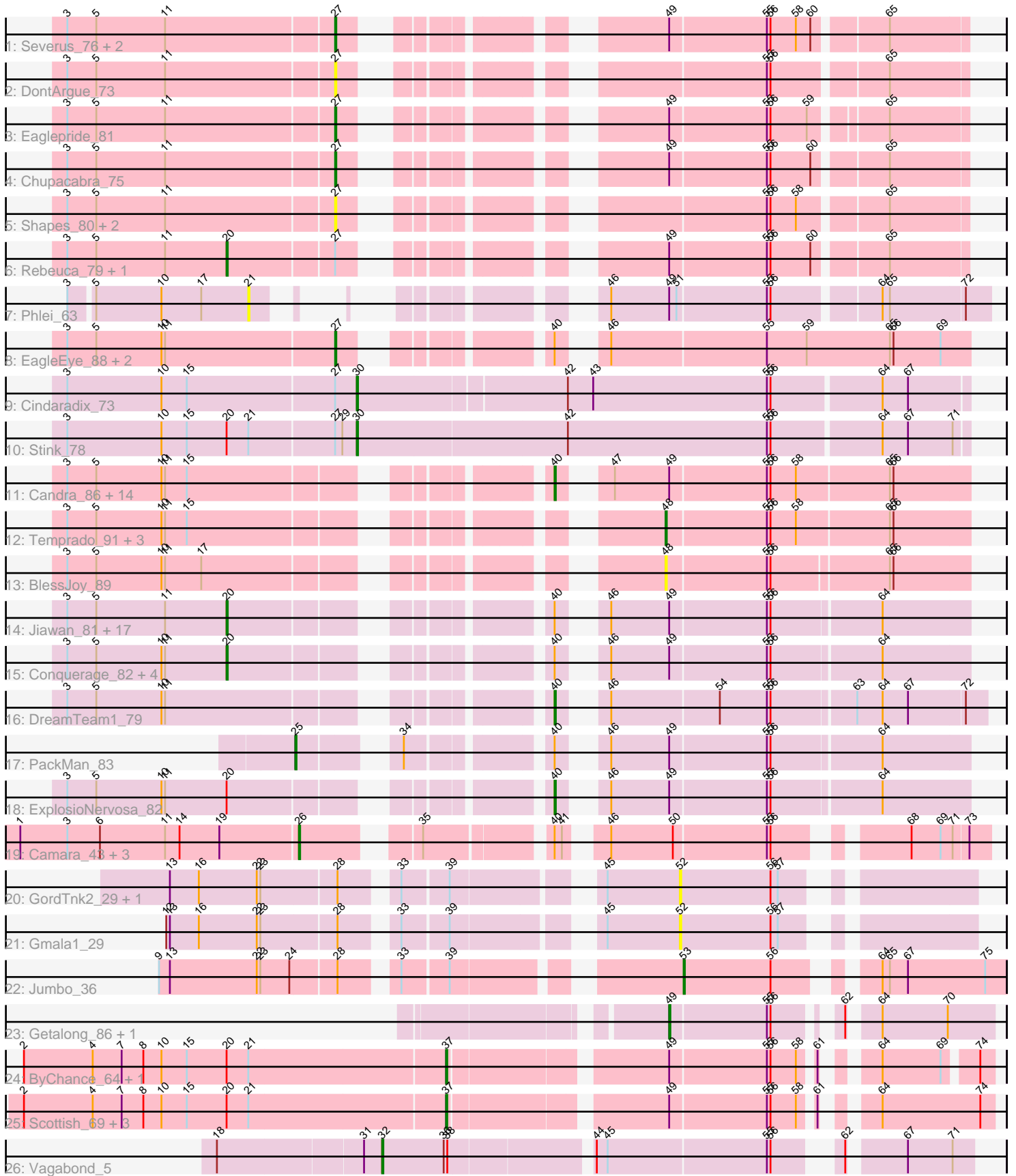


Pham 202878



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 202878 Report

This analysis was run 01/18/25 on database version 583.

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

Pham number 202878 has 80 members, 24 are drafts.

Phages represented in each track:

- Track 1 : Severus\_76, Poompha\_75, PeaceMeal1\_75
- Track 2 : DontArgue\_73
- Track 3 : Eaglepride\_81
- Track 4 : Chupacabra\_75
- Track 5 : Shapes\_80, DustyMartin\_80, Rowdy\_80
- Track 6 : Rebeuca\_79, Twister\_78
- Track 7 : Phlei\_63
- Track 8 : EagleEye\_88, Lucyedi\_87, PainterBoy\_86
- Track 9 : Cindaradix\_73
- Track 10 : Stink\_78
- Track 11 : Candra\_86, DaVinci\_86, Pmask\_87, Chartreuse\_86, McFly\_88, SuperCallie99\_84, Neeharika16\_87, GreedyLawyer\_81, Priamo\_89, Newrala\_87, VohminGhazi\_88, Zulu\_91, Kipper29\_88, EricB\_86, SuperAwesome\_88
- Track 12 : Temprado\_91, Garak\_91, Helmet\_91, Indra\_93
- Track 13 : BlessJoy\_89
- Track 14 : Jiawan\_81, Hanray\_82, EdogawaKiddo\_82, RyeScarlet\_85, Beemo\_84, Onglai\_82, Catalina\_86, HortumSL17\_85, Lilleskat\_81, Tubs\_84, Phonnegut\_84, Horex\_82, Sachima\_80, Phaeder\_84, Pioneer\_84, Myxus\_84, Scherzo\_82, Fayely\_82
- Track 15 : Conquerage\_82, Qobbit\_82, EmyBug\_81, Alma\_82, Eidsmoe\_82
- Track 16 : DreamTeam1\_79
- Track 17 : PackMan\_83
- Track 18 : ExplosioNervosa\_82
- Track 19 : Camara\_43, Glotell\_45, Renna12\_42, KHumphrey\_43
- Track 20 : GordTnk2\_29, GordDuk1\_29
- Track 21 : Gmala1\_29
- Track 22 : Jumbo\_36
- Track 23 : Getalong\_86, Whitney\_81
- Track 24 : ByChance\_64, ShowerHandel\_74
- Track 25 : Scottish\_69, KingMidas\_70, Sassafras\_72, Inventum\_69
- Track 26 : Vagabond\_5

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

The start number called the most often in the published annotations is 20, it was called in 17 of the 56 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Alma\_82, Beemo\_84, Catalina\_86, Conquerage\_82, EdogawaKiddo\_82, Eidsmoe\_82, EmyBug\_81, Fayely\_82, Hanray\_82, Horex\_82, HortumSL17\_85, Jiawan\_81, Lilleskat\_81, Myxus\_84, Onglai\_82, Phaeder\_84, Phonnegut\_84, Pioneer\_84, Qobbit\_82, Rebeuca\_79, RyeScarlet\_85, Sachima\_80, Scherzo\_82, Tubs\_84, Twister\_78,

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

- ByChance\_64, ExplosioNervosa\_82, Inventum\_69, KingMidas\_70, Sassafras\_72, Scottish\_69, ShowerHandel\_74, Stink\_78,

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

- BlessJoy\_89, Camara\_43, Candra\_86, Chartreuse\_86, Chupacabra\_75, Cindaradix\_73, DaVinci\_86, DontArgue\_73, DreamTeam1\_79, DustyMartin\_80, EagleEye\_88, Eaglepride\_81, EricB\_86, Garak\_91, Getalong\_86, Glotell\_45, Gmala1\_29, GordDuk1\_29, GordTnk2\_29, GreedyLawyer\_81, Helmet\_91, Indra\_93, Jumbo\_36, KHumphrey\_43, Kipper29\_88, Lucyedi\_87, McFly\_88, Neeharika16\_87, Newrala\_87, PackMan\_83, PainterBoy\_86, PeaceMeal1\_75, Phlei\_63, Pmask\_87, Poompha\_75, Priamo\_89, Renna12\_42, Rowdy\_80, Severus\_76, Shapes\_80, SuperAwesome\_88, SuperCallie99\_84, Temprado\_91, Vagabond\_5, VohminGhazi\_88, Whitney\_81, Zulu\_91,

### **Summary by start number:**

Start 20:

- Found in 33 of 80 ( 41.2% ) of genes in pham
- Manual Annotations of this start: 17 of 56
- Called 75.8% of time when present
- Phage (with cluster) where this start called: Alma\_82 (A9), Beemo\_84 (A9), Catalina\_86 (A9), Conquerage\_82 (A9), EdogawaKiddo\_82 (A9), Eidsmoe\_82 (A9), EmyBug\_81 (A9), Fayely\_82 (A9), Hanray\_82 (A9), Horex\_82 (A9), HortumSL17\_85 (A9), Jiawan\_81 (A9), Lilleskat\_81 (A9), Myxus\_84 (A9), Onglai\_82 (A9), Phaeder\_84 (A9), Phonnegut\_84 (A9), Pioneer\_84 (A9), Qobbit\_82 (A9), Rebeuca\_79 (A10), RyeScarlet\_85 (A9), Sachima\_80 (A9), Scherzo\_82 (A9), Tubs\_84 (A9), Twister\_78 (A10),

Start 21:

- Found in 8 of 80 ( 10.0% ) of genes in pham
- No Manual Annotations of this start.
- Called 12.5% of time when present
- Phage (with cluster) where this start called: Phlei\_63 (A13),

Start 25:

- Found in 1 of 80 ( 1.2% ) 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: PackMan\_83 (A9),

Start 26:

- Found in 4 of 80 ( 5.0% ) 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: Camara\_43 (AS3), Glotell\_45 (AS3), KHumphrey\_43 (AS3), Renna12\_42 (AS3),

Start 27:

- Found in 16 of 80 ( 20.0% ) of genes in pham
- Manual Annotations of this start: 8 of 56
- Called 75.0% of time when present
- Phage (with cluster) where this start called: Chupacabra\_75 (A10), DontArgue\_73 (A10), DustyMartin\_80 (A10), EagleEye\_88 (A16), Eaglepride\_81 (A10), Lucyedi\_87 (A16), PainterBoy\_86 (A16), PeaceMeal1\_75 (A10), Poompha\_75 (A10), Rowdy\_80 (A10), Severus\_76 (A10), Shapes\_80 (A10),

Start 30:

- Found in 2 of 80 ( 2.5% ) 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: Cindaradix\_73 (A4), Stink\_78 (A4),

Start 32:

- Found in 1 of 80 ( 1.2% ) 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: Vagabond\_5 (O),

Start 37:

- Found in 6 of 80 ( 7.5% ) 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: ByChance\_64 (F1), Inventum\_69 (F1), KingMidas\_70 (F1), Sassafras\_72 (F1), Scottish\_69 (F1), ShowerHandel\_74 (F1),

Start 40:

- Found in 48 of 80 ( 60.0% ) of genes in pham
- Manual Annotations of this start: 15 of 56
- Called 35.4% of time when present
- Phage (with cluster) where this start called: Candra\_86 (A6), Chartreuse\_86 (A6), DaVinci\_86 (A6), DreamTeam1\_79 (A9), EricB\_86 (A6), ExplosioNervosa\_82 (A9), GreedyLawyer\_81 (A6), Kipper29\_88 (A6), McFly\_88 (A6), Neeharika16\_87 (A6), Newrala\_87 (A6), Pmask\_87 (A6), Priamo\_89 (A6), SuperAwesome\_88 (A6), SuperCallie99\_84 (A6), VohminGhazi\_88 (A6), Zulu\_91 (A6),

Start 48:

- Found in 5 of 80 ( 6.2% ) 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: BlessJoy\_89 (A6), Garak\_91 (A6), Helmet\_91 (A6), Indra\_93 (A6), Temprado\_91 (A6),

Start 49:

- Found in 56 of 80 ( 70.0% ) of genes in pham
- Manual Annotations of this start: 2 of 56
- Called 3.6% of time when present
- Phage (with cluster) where this start called: Getalong\_86 (DN1), Whitney\_81 (DN1),

Start 52:

- Found in 3 of 80 ( 3.8% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gmala1\_29 (DF1), GordDuk1\_29 (DF1), GordTnk2\_29 (DF1),

Start 53:

- Found in 1 of 80 ( 1.2% ) 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: Jumbo\_36 (DF3),

**Summary by clusters:**

There are 12 clusters represented in this pham: AS3, F1, A16, A10, A13, DF1, DF3, DN1, A4, O, A6, A9,

Info for manual annotations of cluster A10:

- Start number 20 was manually annotated 2 times for cluster A10.
- Start number 27 was manually annotated 5 times for cluster A10.

Info for manual annotations of cluster A16:

- Start number 27 was manually annotated 3 times for cluster A16.

Info for manual annotations of cluster A4:

- Start number 30 was manually annotated 2 times for cluster A4.

Info for manual annotations of cluster A6:

- Start number 40 was manually annotated 13 times for cluster A6.
- Start number 48 was manually annotated 1 time for cluster A6.

Info for manual annotations of cluster A9:

- Start number 20 was manually annotated 15 times for cluster A9.
- Start number 25 was manually annotated 1 time for cluster A9.
- Start number 40 was manually annotated 2 times for cluster A9.

Info for manual annotations of cluster AS3:

- Start number 26 was manually annotated 2 times for cluster AS3.

Info for manual annotations of cluster DF3:

- Start number 53 was manually annotated 1 time for cluster DF3.

Info for manual annotations of cluster DN1:

- Start number 49 was manually annotated 2 times for cluster DN1.

Info for manual annotations of cluster F1:

•Start number 37 was manually annotated 6 times for cluster F1.

Info for manual annotations of cluster O:

•Start number 32 was manually annotated 1 time for cluster O.

### **Gene Information:**

Gene: Alma\_82 Start: 46797, Stop: 46282, Start Num: 20

Candidate Starts for Alma\_82:

(3, 46929), (5, 46905), (10, 46851), (11, 46848), (Start: 20 @46797 has 17 MA's), (Start: 40 @46590 has 15 MA's), (46, 46569), (Start: 49 @46521 has 2 MA's), (55, 46443), (56, 46440), (64, 46353),

Gene: Beemo\_84 Start: 46790, Stop: 46275, Start Num: 20

Candidate Starts for Beemo\_84:

(3, 46922), (5, 46898), (11, 46841), (Start: 20 @46790 has 17 MA's), (Start: 40 @46583 has 15 MA's), (46, 46562), (Start: 49 @46514 has 2 MA's), (55, 46436), (56, 46433), (64, 46346),

Gene: BlessJoy\_89 Start: 47321, Stop: 47079, Start Num: 48

Candidate Starts for BlessJoy\_89:

(3, 47726), (5, 47702), (10, 47648), (11, 47645), (17, 47615), (Start: 48 @47321 has 1 MA's), (55, 47240), (56, 47237), (65, 47144), (66, 47141),

Gene: ByChance\_64 Start: 42129, Stop: 42512, Start Num: 37

Candidate Starts for ByChance\_64:

(2, 41784), (4, 41841), (7, 41865), (8, 41883), (10, 41898), (15, 41919), (Start: 20 @41952 has 17 MA's), (21, 41970), (Start: 37 @42129 has 6 MA's), (Start: 49 @42291 has 2 MA's), (55, 42369), (56, 42372), (58, 42393), (61, 42402), (64, 42429), (69, 42477), (74, 42501),

Gene: Camara\_43 Start: 27400, Stop: 27867, Start Num: 26

Candidate Starts for Camara\_43:

(1, 27172), (3, 27211), (6, 27238), (11, 27292), (14, 27304), (19, 27337), (Start: 26 @27400 has 2 MA's), (35, 27475), (Start: 40 @27565 has 15 MA's), (41, 27571), (46, 27592), (50, 27643), (55, 27718), (56, 27721), (68, 27805), (69, 27829), (71, 27838), (73, 27850),

Gene: Candra\_86 Start: 46902, Stop: 46591, Start Num: 40

Candidate Starts for Candra\_86:

(3, 47241), (5, 47217), (10, 47163), (11, 47160), (15, 47142), (Start: 40 @46902 has 15 MA's), (47, 46878), (Start: 49 @46833 has 2 MA's), (55, 46755), (56, 46752), (58, 46731), (65, 46656), (66, 46653),

Gene: Catalina\_86 Start: 46900, Stop: 46385, Start Num: 20

Candidate Starts for Catalina\_86:

(3, 47032), (5, 47008), (11, 46951), (Start: 20 @46900 has 17 MA's), (Start: 40 @46693 has 15 MA's), (46, 46672), (Start: 49 @46624 has 2 MA's), (55, 46546), (56, 46543), (64, 46456),

Gene: Chartreuse\_86 Start: 46203, Stop: 45892, Start Num: 40

Candidate Starts for Chartreuse\_86:

(3, 46542), (5, 46518), (10, 46464), (11, 46461), (15, 46443), (Start: 40 @46203 has 15 MA's), (47, 46179), (Start: 49 @46134 has 2 MA's), (55, 46056), (56, 46053), (58, 46032), (65, 45957), (66,

45954),

Gene: Chupacabra\_75 Start: 46471, Stop: 46052, Start Num: 27

Candidate Starts for Chupacabra\_75:

(3, 46687), (5, 46663), (11, 46606), (Start: 27 @46471 has 8 MA's), (Start: 49 @46282 has 2 MA's), (55, 46204), (56, 46201), (60, 46168), (65, 46114),

Gene: Cindaradix\_73 Start: 46788, Stop: 46300, Start Num: 30

Candidate Starts for Cindaradix\_73:

(3, 47025), (10, 46947), (15, 46926), (Start: 27 @46806 has 8 MA's), (Start: 30 @46788 has 2 MA's), (42, 46623), (43, 46602), (55, 46458), (56, 46455), (64, 46368), (67, 46347),

Gene: Conquerage\_82 Start: 46566, Stop: 46051, Start Num: 20

Candidate Starts for Conquerage\_82:

(3, 46698), (5, 46674), (10, 46620), (11, 46617), (Start: 20 @46566 has 17 MA's), (Start: 40 @46359 has 15 MA's), (46, 46338), (Start: 49 @46290 has 2 MA's), (55, 46212), (56, 46209), (64, 46122),

Gene: DaVinci\_86 Start: 46257, Stop: 45946, Start Num: 40

Candidate Starts for DaVinci\_86:

(3, 46596), (5, 46572), (10, 46518), (11, 46515), (15, 46497), (Start: 40 @46257 has 15 MA's), (47, 46233), (Start: 49 @46188 has 2 MA's), (55, 46110), (56, 46107), (58, 46086), (65, 46011), (66, 46008),

Gene: DontArgue\_73 Start: 45331, Stop: 44912, Start Num: 27

Candidate Starts for DontArgue\_73:

(3, 45547), (5, 45523), (11, 45466), (Start: 27 @45331 has 8 MA's), (55, 45064), (56, 45061), (65, 44974),

Gene: DreamTeam1\_79 Start: 45877, Stop: 45557, Start Num: 40

Candidate Starts for DreamTeam1\_79:

(3, 46216), (5, 46192), (10, 46138), (11, 46135), (Start: 40 @45877 has 15 MA's), (46, 45856), (54, 45769), (55, 45730), (56, 45727), (63, 45661), (64, 45640), (67, 45619), (72, 45574),

Gene: DustyMartin\_80 Start: 46614, Stop: 46195, Start Num: 27

Candidate Starts for DustyMartin\_80:

(3, 46830), (5, 46806), (11, 46749), (Start: 27 @46614 has 8 MA's), (55, 46347), (56, 46344), (58, 46323), (65, 46257),

Gene: EagleEye\_88 Start: 48605, Stop: 48168, Start Num: 27

Candidate Starts for EagleEye\_88:

(3, 48824), (5, 48800), (10, 48746), (11, 48743), (Start: 27 @48605 has 8 MA's), (Start: 40 @48482 has 15 MA's), (46, 48461), (55, 48335), (59, 48302), (65, 48233), (66, 48230), (69, 48191),

Gene: Eaglepride\_81 Start: 46551, Stop: 46135, Start Num: 27

Candidate Starts for Eaglepride\_81:

(3, 46767), (5, 46743), (11, 46686), (Start: 27 @46551 has 8 MA's), (Start: 49 @46362 has 2 MA's), (55, 46284), (56, 46281), (59, 46251), (65, 46197),

Gene: EdogawaKiddo\_82 Start: 46868, Stop: 46353, Start Num: 20

Candidate Starts for EdogawaKiddo\_82:

(3, 47000), (5, 46976), (11, 46919), (Start: 20 @46868 has 17 MA's), (Start: 40 @46661 has 15 MA's), (46, 46640), (Start: 49 @46592 has 2 MA's), (55, 46514), (56, 46511), (64, 46424),

Gene: Eidsmoe\_82 Start: 46558, Stop: 46043, Start Num: 20

Candidate Starts for Eidsmoe\_82:

(3, 46690), (5, 46666), (10, 46612), (11, 46609), (Start: 20 @46558 has 17 MA's), (Start: 40 @46351 has 15 MA's), (46, 46330), (Start: 49 @46282 has 2 MA's), (55, 46204), (56, 46201), (64, 46114),

Gene: EmyBug\_81 Start: 46560, Stop: 46045, Start Num: 20

Candidate Starts for EmyBug\_81:

(3, 46692), (5, 46668), (10, 46614), (11, 46611), (Start: 20 @46560 has 17 MA's), (Start: 40 @46353 has 15 MA's), (46, 46332), (Start: 49 @46284 has 2 MA's), (55, 46206), (56, 46203), (64, 46116),

Gene: EricB\_86 Start: 46400, Stop: 46089, Start Num: 40

Candidate Starts for EricB\_86:

(3, 46739), (5, 46715), (10, 46661), (11, 46658), (15, 46640), (Start: 40 @46400 has 15 MA's), (47, 46376), (Start: 49 @46331 has 2 MA's), (55, 46253), (56, 46250), (58, 46229), (65, 46154), (66, 46151),

Gene: ExplosioNervosa\_82 Start: 46419, Stop: 46111, Start Num: 40

Candidate Starts for ExplosioNervosa\_82:

(3, 46758), (5, 46734), (10, 46680), (11, 46677), (Start: 20 @46626 has 17 MA's), (Start: 40 @46419 has 15 MA's), (46, 46398), (Start: 49 @46350 has 2 MA's), (55, 46272), (56, 46269), (64, 46182),

Gene: Fayely\_82 Start: 46533, Stop: 46018, Start Num: 20

Candidate Starts for Fayely\_82:

(3, 46665), (5, 46641), (11, 46584), (Start: 20 @46533 has 17 MA's), (Start: 40 @46326 has 15 MA's), (46, 46305), (Start: 49 @46257 has 2 MA's), (55, 46179), (56, 46176), (64, 46089),

Gene: Garak\_91 Start: 47274, Stop: 47029, Start Num: 48

Candidate Starts for Garak\_91:

(3, 47679), (5, 47655), (10, 47601), (11, 47598), (15, 47580), (Start: 48 @47274 has 1 MA's), (55, 47193), (56, 47190), (58, 47169), (65, 47094), (66, 47091),

Gene: Getalong\_86 Start: 49030, Stop: 49260, Start Num: 49

Candidate Starts for Getalong\_86:

(Start: 49 @49030 has 2 MA's), (55, 49108), (56, 49111), (62, 49150), (64, 49168), (70, 49222),

Gene: Glotell\_45 Start: 27556, Stop: 28023, Start Num: 26

Candidate Starts for Glotell\_45:

(1, 27328), (3, 27367), (6, 27394), (11, 27448), (14, 27460), (19, 27493), (Start: 26 @27556 has 2 MA's), (35, 27631), (Start: 40 @27721 has 15 MA's), (41, 27727), (46, 27748), (50, 27799), (55, 27874), (56, 27877), (68, 27961), (69, 27985), (71, 27994), (73, 28006),

Gene: Gmala1\_29 Start: 35756, Stop: 35965, Start Num: 52

Candidate Starts for Gmala1\_29:

(12, 35387), (13, 35390), (16, 35414), (22, 35462), (23, 35465), (28, 35525), (33, 35561), (39, 35597), (45, 35696), (52, 35756), (56, 35831), (57, 35837),

Gene: GordDuk1\_29 Start: 35694, Stop: 35903, Start Num: 52

Candidate Starts for GordDuk1\_29:

(13, 35328), (16, 35352), (22, 35400), (23, 35403), (28, 35463), (33, 35499), (39, 35535), (45, 35634), (52, 35694), (56, 35769), (57, 35775),

Gene: GordTnk2\_29 Start: 35663, Stop: 35872, Start Num: 52

Candidate Starts for GordTnk2\_29:



(13, 35297), (16, 35321), (22, 35369), (23, 35372), (28, 35432), (33, 35468), (39, 35504), (45, 35603), (52, 35663), (56, 35738), (57, 35744),

Gene: GreedyLawyer\_81 Start: 46833, Stop: 46522, Start Num: 40

Candidate Starts for GreedyLawyer\_81:

(3, 47172), (5, 47148), (10, 47094), (11, 47091), (15, 47073), (Start: 40 @46833 has 15 MA's), (47, 46809), (Start: 49 @46764 has 2 MA's), (55, 46686), (56, 46683), (58, 46662), (65, 46587), (66, 46584),

Gene: Hanray\_82 Start: 46844, Stop: 46329, Start Num: 20

Candidate Starts for Hanray\_82:

(3, 46976), (5, 46952), (11, 46895), (Start: 20 @46844 has 17 MA's), (Start: 40 @46637 has 15 MA's), (46, 46616), (Start: 49 @46568 has 2 MA's), (55, 46490), (56, 46487), (64, 46400),

Gene: Helmet\_91 Start: 47274, Stop: 47029, Start Num: 48

Candidate Starts for Helmet\_91:

(3, 47679), (5, 47655), (10, 47601), (11, 47598), (15, 47580), (Start: 48 @47274 has 1 MA's), (55, 47193), (56, 47190), (58, 47169), (65, 47094), (66, 47091),

Gene: Horex\_82 Start: 46860, Stop: 46345, Start Num: 20

Candidate Starts for Horex\_82:

(3, 46992), (5, 46968), (11, 46911), (Start: 20 @46860 has 17 MA's), (Start: 40 @46653 has 15 MA's), (46, 46632), (Start: 49 @46584 has 2 MA's), (55, 46506), (56, 46503), (64, 46416),

Gene: HortumSL17\_85 Start: 46898, Stop: 46383, Start Num: 20

Candidate Starts for HortumSL17\_85:

(3, 47030), (5, 47006), (11, 46949), (Start: 20 @46898 has 17 MA's), (Start: 40 @46691 has 15 MA's), (46, 46670), (Start: 49 @46622 has 2 MA's), (55, 46544), (56, 46541), (64, 46454),

Gene: Indra\_93 Start: 47275, Stop: 47030, Start Num: 48

Candidate Starts for Indra\_93:

(3, 47680), (5, 47656), (10, 47602), (11, 47599), (15, 47581), (Start: 48 @47275 has 1 MA's), (55, 47194), (56, 47191), (58, 47170), (65, 47095), (66, 47092),

Gene: Inventum\_69 Start: 45166, Stop: 45558, Start Num: 37

Candidate Starts for Inventum\_69:

(2, 44821), (4, 44878), (7, 44902), (8, 44920), (10, 44935), (15, 44956), (Start: 20 @44989 has 17 MA's), (21, 45007), (Start: 37 @45166 has 6 MA's), (Start: 49 @45328 has 2 MA's), (55, 45406), (56, 45409), (58, 45430), (61, 45439), (64, 45466), (74, 45547),

Gene: Jiawan\_81 Start: 46876, Stop: 46361, Start Num: 20

Candidate Starts for Jiawan\_81:

(3, 47008), (5, 46984), (11, 46927), (Start: 20 @46876 has 17 MA's), (Start: 40 @46669 has 15 MA's), (46, 46648), (Start: 49 @46600 has 2 MA's), (55, 46522), (56, 46519), (64, 46432),

Gene: Jumbo\_36 Start: 42029, Stop: 42262, Start Num: 53

Candidate Starts for Jumbo\_36:

(9, 41654), (13, 41663), (22, 41735), (23, 41738), (24, 41762), (28, 41798), (33, 41834), (39, 41870), (Start: 53 @42029 has 1 MA's), (56, 42101), (64, 42161), (65, 42167), (67, 42182), (75, 42245),

Gene: KHumphrey\_43 Start: 27399, Stop: 27866, Start Num: 26

Candidate Starts for KHumphrey\_43:

(1, 27171), (3, 27210), (6, 27237), (11, 27291), (14, 27303), (19, 27336), (Start: 26 @27399 has 2 MA's), (35, 27474), (Start: 40 @27564 has 15 MA's), (41, 27570), (46, 27591), (50, 27642), (55, 27717), (56, 27720), (68, 27804), (69, 27828), (71, 27837), (73, 27849),

Gene: KingMidas\_70 Start: 45569, Stop: 45961, Start Num: 37

Candidate Starts for KingMidas\_70:

(2, 45224), (4, 45281), (7, 45305), (8, 45323), (10, 45338), (15, 45359), (Start: 20 @45392 has 17 MA's), (21, 45410), (Start: 37 @45569 has 6 MA's), (Start: 49 @45731 has 2 MA's), (55, 45809), (56, 45812), (58, 45833), (61, 45842), (64, 45869), (74, 45950),

Gene: Kipper29\_88 Start: 46875, Stop: 46564, Start Num: 40

Candidate Starts for Kipper29\_88:

(3, 47214), (5, 47190), (10, 47136), (11, 47133), (15, 47115), (Start: 40 @46875 has 15 MA's), (47, 46851), (Start: 49 @46806 has 2 MA's), (55, 46728), (56, 46725), (58, 46704), (65, 46629), (66, 46626),

Gene: Lilleskat\_81 Start: 46857, Stop: 46342, Start Num: 20

Candidate Starts for Lilleskat\_81:

(3, 46989), (5, 46965), (11, 46908), (Start: 20 @46857 has 17 MA's), (Start: 40 @46650 has 15 MA's), (46, 46629), (Start: 49 @46581 has 2 MA's), (55, 46503), (56, 46500), (64, 46413),

Gene: Lucyedi\_87 Start: 48804, Stop: 48367, Start Num: 27

Candidate Starts for Lucyedi\_87:

(3, 49023), (5, 48999), (10, 48945), (11, 48942), (Start: 27 @48804 has 8 MA's), (Start: 40 @48681 has 15 MA's), (46, 48660), (55, 48534), (59, 48501), (65, 48432), (66, 48429), (69, 48390),

Gene: McFly\_88 Start: 47211, Stop: 46900, Start Num: 40

Candidate Starts for McFly\_88:

(3, 47550), (5, 47526), (10, 47472), (11, 47469), (15, 47451), (Start: 40 @47211 has 15 MA's), (47, 47187), (Start: 49 @47142 has 2 MA's), (55, 47064), (56, 47061), (58, 47040), (65, 46965), (66, 46962),

Gene: Myxus\_84 Start: 46898, Stop: 46383, Start Num: 20

Candidate Starts for Myxus\_84:

(3, 47030), (5, 47006), (11, 46949), (Start: 20 @46898 has 17 MA's), (Start: 40 @46691 has 15 MA's), (46, 46670), (Start: 49 @46622 has 2 MA's), (55, 46544), (56, 46541), (64, 46454),

Gene: Neeharika16\_87 Start: 46962, Stop: 46651, Start Num: 40

Candidate Starts for Neeharika16\_87:

(3, 47301), (5, 47277), (10, 47223), (11, 47220), (15, 47202), (Start: 40 @46962 has 15 MA's), (47, 46938), (Start: 49 @46893 has 2 MA's), (55, 46815), (56, 46812), (58, 46791), (65, 46716), (66, 46713),

Gene: Newrala\_87 Start: 47308, Stop: 46997, Start Num: 40

Candidate Starts for Newrala\_87:

(3, 47647), (5, 47623), (10, 47569), (11, 47566), (15, 47548), (Start: 40 @47308 has 15 MA's), (47, 47284), (Start: 49 @47239 has 2 MA's), (55, 47161), (56, 47158), (58, 47137), (65, 47062), (66, 47059),

Gene: Onglai\_82 Start: 45048, Stop: 44533, Start Num: 20

Candidate Starts for Onglai\_82:

(3, 45180), (5, 45156), (11, 45099), (Start: 20 @45048 has 17 MA's), (Start: 40 @44841 has 15 MA's), (46, 44820), (Start: 49 @44772 has 2 MA's), (55, 44694), (56, 44691), (64, 44604),

Gene: PackMan\_83 Start: 46722, Stop: 46258, Start Num: 25

Candidate Starts for PackMan\_83:

(Start: 25 @46722 has 1 MA's), (34, 46662), (Start: 40 @46566 has 15 MA's), (46, 46545), (Start: 49 @46497 has 2 MA's), (55, 46419), (56, 46416), (64, 46329),

Gene: PainterBoy\_86 Start: 48515, Stop: 48078, Start Num: 27

Candidate Starts for PainterBoy\_86:

(3, 48734), (5, 48710), (10, 48656), (11, 48653), (Start: 27 @48515 has 8 MA's), (Start: 40 @48392 has 15 MA's), (46, 48371), (55, 48245), (59, 48212), (65, 48143), (66, 48140), (69, 48101),

Gene: PeaceMeal1\_75 Start: 45639, Stop: 45220, Start Num: 27

Candidate Starts for PeaceMeal1\_75:

(3, 45855), (5, 45831), (11, 45774), (Start: 27 @45639 has 8 MA's), (Start: 49 @45450 has 2 MA's), (55, 45372), (56, 45369), (58, 45348), (60, 45336), (65, 45282),

Gene: Phaeder\_84 Start: 46773, Stop: 46258, Start Num: 20

Candidate Starts for Phaeder\_84:

(3, 46905), (5, 46881), (11, 46824), (Start: 20 @46773 has 17 MA's), (Start: 40 @46566 has 15 MA's), (46, 46545), (Start: 49 @46497 has 2 MA's), (55, 46419), (56, 46416), (64, 46329),

Gene: Phlei\_63 Start: 43732, Stop: 43292, Start Num: 21

Candidate Starts for Phlei\_63:

(3, 43876), (5, 43858), (10, 43804), (17, 43771), (21, 43732), (46, 43588), (Start: 49 @43540 has 2 MA's), (51, 43534), (55, 43462), (56, 43459), (64, 43378), (65, 43372), (72, 43312),

Gene: Phonnegut\_84 Start: 46789, Stop: 46274, Start Num: 20

Candidate Starts for Phonnegut\_84:

(3, 46921), (5, 46897), (11, 46840), (Start: 20 @46789 has 17 MA's), (Start: 40 @46582 has 15 MA's), (46, 46561), (Start: 49 @46513 has 2 MA's), (55, 46435), (56, 46432), (64, 46345),

Gene: Pioneer\_84 Start: 46789, Stop: 46274, Start Num: 20

Candidate Starts for Pioneer\_84:

(3, 46921), (5, 46897), (11, 46840), (Start: 20 @46789 has 17 MA's), (Start: 40 @46582 has 15 MA's), (46, 46561), (Start: 49 @46513 has 2 MA's), (55, 46435), (56, 46432), (64, 46345),

Gene: Pmask\_87 Start: 47509, Stop: 47198, Start Num: 40

Candidate Starts for Pmask\_87:

(3, 47848), (5, 47824), (10, 47770), (11, 47767), (15, 47749), (Start: 40 @47509 has 15 MA's), (47, 47485), (Start: 49 @47440 has 2 MA's), (55, 47362), (56, 47359), (58, 47338), (65, 47263), (66, 47260),

Gene: Poompha\_75 Start: 45637, Stop: 45218, Start Num: 27

Candidate Starts for Poompha\_75:

(3, 45853), (5, 45829), (11, 45772), (Start: 27 @45637 has 8 MA's), (Start: 49 @45448 has 2 MA's), (55, 45370), (56, 45367), (58, 45346), (60, 45334), (65, 45280),

Gene: Priamo\_89 Start: 46752, Stop: 46441, Start Num: 40

Candidate Starts for Priamo\_89:

(3, 47091), (5, 47067), (10, 47013), (11, 47010), (15, 46992), (Start: 40 @46752 has 15 MA's), (47, 46728), (Start: 49 @46683 has 2 MA's), (55, 46605), (56, 46602), (58, 46581), (65, 46506), (66, 46503),

Gene: Qobbit\_82 Start: 46523, Stop: 46008, Start Num: 20

Candidate Starts for Qobbit\_82:

(3, 46655), (5, 46631), (10, 46577), (11, 46574), (Start: 20 @46523 has 17 MA's), (Start: 40 @46316 has 15 MA's), (46, 46295), (Start: 49 @46247 has 2 MA's), (55, 46169), (56, 46166), (64, 46079),

Gene: Rebeuca\_79 Start: 46991, Stop: 46488, Start Num: 20

Candidate Starts for Rebeuca\_79:

(3, 47123), (5, 47099), (11, 47042), (Start: 20 @46991 has 17 MA's), (Start: 27 @46907 has 8 MA's), (Start: 49 @46718 has 2 MA's), (55, 46640), (56, 46637), (60, 46604), (65, 46550),

Gene: Renna12\_42 Start: 27456, Stop: 27923, Start Num: 26

Candidate Starts for Renna12\_42:

(1, 27228), (3, 27267), (6, 27294), (11, 27348), (14, 27360), (19, 27393), (Start: 26 @27456 has 2 MA's), (35, 27531), (Start: 40 @27621 has 15 MA's), (41, 27627), (46, 27648), (50, 27699), (55, 27774), (56, 27777), (68, 27861), (69, 27885), (71, 27894), (73, 27906),

Gene: Rowdy\_80 Start: 46614, Stop: 46195, Start Num: 27

Candidate Starts for Rowdy\_80:

(3, 46830), (5, 46806), (11, 46749), (Start: 27 @46614 has 8 MA's), (55, 46347), (56, 46344), (58, 46323), (65, 46257),

Gene: RyeScarlet\_85 Start: 46764, Stop: 46249, Start Num: 20

Candidate Starts for RyeScarlet\_85:

(3, 46896), (5, 46872), (11, 46815), (Start: 20 @46764 has 17 MA's), (Start: 40 @46557 has 15 MA's), (46, 46536), (Start: 49 @46488 has 2 MA's), (55, 46410), (56, 46407), (64, 46320),

Gene: Sachima\_80 Start: 46801, Stop: 46286, Start Num: 20

Candidate Starts for Sachima\_80:

(3, 46933), (5, 46909), (11, 46852), (Start: 20 @46801 has 17 MA's), (Start: 40 @46594 has 15 MA's), (46, 46573), (Start: 49 @46525 has 2 MA's), (55, 46447), (56, 46444), (64, 46357),

Gene: Sassafras\_72 Start: 45165, Stop: 45557, Start Num: 37

Candidate Starts for Sassafras\_72:

(2, 44820), (4, 44877), (7, 44901), (8, 44919), (10, 44934), (15, 44955), (Start: 20 @44988 has 17 MA's), (21, 45006), (Start: 37 @45165 has 6 MA's), (Start: 49 @45327 has 2 MA's), (55, 45405), (56, 45408), (58, 45429), (61, 45438), (64, 45465), (74, 45546),

Gene: Scherzo\_82 Start: 46821, Stop: 46306, Start Num: 20

Candidate Starts for Scherzo\_82:

(3, 46953), (5, 46929), (11, 46872), (Start: 20 @46821 has 17 MA's), (Start: 40 @46614 has 15 MA's), (46, 46593), (Start: 49 @46545 has 2 MA's), (55, 46467), (56, 46464), (64, 46377),

Gene: Scottish\_69 Start: 44824, Stop: 45216, Start Num: 37

Candidate Starts for Scottish\_69:

(2, 44479), (4, 44536), (7, 44560), (8, 44578), (10, 44593), (15, 44614), (Start: 20 @44647 has 17 MA's), (21, 44665), (Start: 37 @44824 has 6 MA's), (Start: 49 @44986 has 2 MA's), (55, 45064), (56, 45067), (58, 45088), (61, 45097), (64, 45124), (74, 45205),

Gene: Severus\_76 Start: 45637, Stop: 45218, Start Num: 27

Candidate Starts for Severus\_76:

(3, 45853), (5, 45829), (11, 45772), (Start: 27 @45637 has 8 MA's), (Start: 49 @45448 has 2 MA's), (55, 45370), (56, 45367), (58, 45346), (60, 45334), (65, 45280),

Gene: Shapes\_80 Start: 46614, Stop: 46195, Start Num: 27

Candidate Starts for Shapes\_80:

(3, 46830), (5, 46806), (11, 46749), (Start: 27 @46614 has 8 MA's), (55, 46347), (56, 46344), (58, 46323), (65, 46257),

Gene: ShowerHandel\_74 Start: 46069, Stop: 46452, Start Num: 37

Candidate Starts for ShowerHandel\_74:

(2, 45724), (4, 45781), (7, 45805), (8, 45823), (10, 45838), (15, 45859), (Start: 20 @45892 has 17 MA's), (21, 45910), (Start: 37 @46069 has 6 MA's), (Start: 49 @46231 has 2 MA's), (55, 46309), (56, 46312), (58, 46333), (61, 46342), (64, 46369), (69, 46417), (74, 46441),

Gene: Stink\_78 Start: 46793, Stop: 46299, Start Num: 30

Candidate Starts for Stink\_78:

(3, 47030), (10, 46952), (15, 46931), (Start: 20 @46898 has 17 MA's), (21, 46880), (Start: 27 @46811 has 8 MA's), (29, 46805), (Start: 30 @46793 has 2 MA's), (42, 46622), (55, 46457), (56, 46454), (64, 46367), (67, 46346), (71, 46310),

Gene: SuperAwesome\_88 Start: 47548, Stop: 47237, Start Num: 40

Candidate Starts for SuperAwesome\_88:

(3, 47887), (5, 47863), (10, 47809), (11, 47806), (15, 47788), (Start: 40 @47548 has 15 MA's), (47, 47524), (Start: 49 @47479 has 2 MA's), (55, 47401), (56, 47398), (58, 47377), (65, 47302), (66, 47299),

Gene: SuperCallie99\_84 Start: 46929, Stop: 46618, Start Num: 40

Candidate Starts for SuperCallie99\_84:

(3, 47268), (5, 47244), (10, 47190), (11, 47187), (15, 47169), (Start: 40 @46929 has 15 MA's), (47, 46905), (Start: 49 @46860 has 2 MA's), (55, 46782), (56, 46779), (58, 46758), (65, 46683), (66, 46680),

Gene: Temprado\_91 Start: 47274, Stop: 47029, Start Num: 48

Candidate Starts for Temprado\_91:

(3, 47679), (5, 47655), (10, 47601), (11, 47598), (15, 47580), (Start: 48 @47274 has 1 MA's), (55, 47193), (56, 47190), (58, 47169), (65, 47094), (66, 47091),

Gene: Tubs\_84 Start: 46773, Stop: 46258, Start Num: 20

Candidate Starts for Tubs\_84:

(3, 46905), (5, 46881), (11, 46824), (Start: 20 @46773 has 17 MA's), (Start: 40 @46566 has 15 MA's), (46, 46545), (Start: 49 @46497 has 2 MA's), (55, 46419), (56, 46416), (64, 46329),

Gene: Twister\_78 Start: 46549, Stop: 46046, Start Num: 20

Candidate Starts for Twister\_78:

(3, 46681), (5, 46657), (11, 46600), (Start: 20 @46549 has 17 MA's), (Start: 27 @46465 has 8 MA's), (Start: 49 @46276 has 2 MA's), (55, 46198), (56, 46195), (60, 46162), (65, 46108),

Gene: Vagabond\_5 Start: 1719, Stop: 1288, Start Num: 32

Candidate Starts for Vagabond\_5:

(18, 1851), (31, 1734), (Start: 32 @1719 has 1 MA's), (36, 1668), (38, 1665), (44, 1557), (45, 1548), (55, 1419), (56, 1416), (62, 1380), (67, 1341), (71, 1305),

Gene: VohminGhazi\_88 Start: 46867, Stop: 46556, Start Num: 40

Candidate Starts for VohminGhazi\_88:

(3, 47206), (5, 47182), (10, 47128), (11, 47125), (15, 47107), (Start: 40 @46867 has 15 MA's), (47, 46843), (Start: 49 @46798 has 2 MA's), (55, 46720), (56, 46717), (58, 46696), (65, 46621), (66,

46618),

Gene: Whitney\_81 Start: 48351, Stop: 48581, Start Num: 49

Candidate Starts for Whitney\_81:

(Start: 49 @48351 has 2 MA's), (55, 48429), (56, 48432), (62, 48471), (64, 48489), (70, 48543),

Gene: Zulu\_91 Start: 47348, Stop: 47037, Start Num: 40

Candidate Starts for Zulu\_91:

(3, 47687), (5, 47663), (10, 47609), (11, 47606), (15, 47588), (Start: 40 @47348 has 15 MA's), (47, 47324), (Start: 49 @47279 has 2 MA's), (55, 47201), (56, 47198), (58, 47177), (65, 47102), (66, 47099),