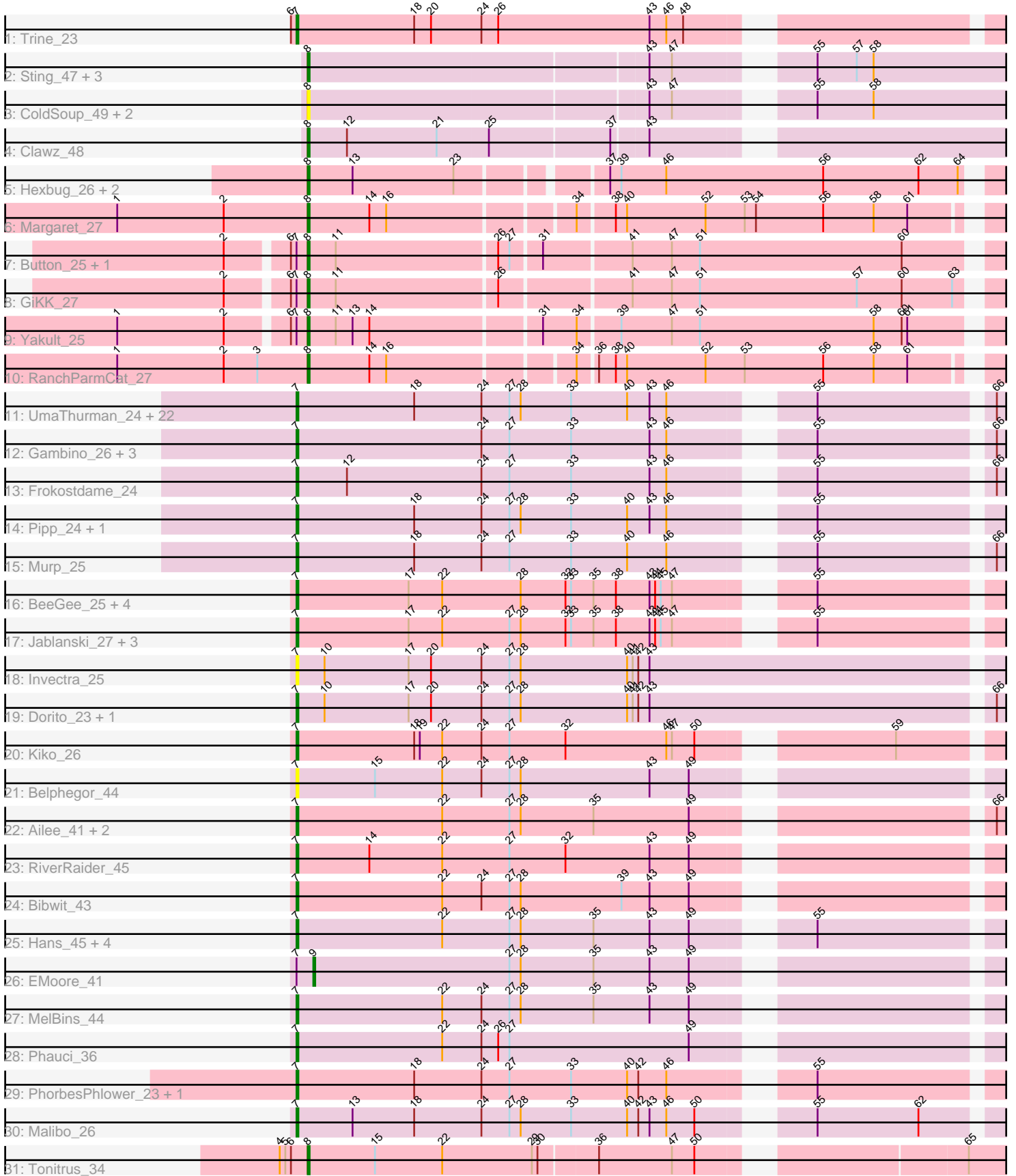


# Zoomed Pham 202882



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 202882 Report

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

Pham number 202882 has 80 members, 9 are drafts.

Phages represented in each track:

- Track 1 : Trine\_23
- Track 2 : Sting\_47, DonTron\_48, Soos\_44, KingstonB\_49
- Track 3 : ColdSoup\_49, Amo99\_49, Jollymon\_49
- Track 4 : Clawz\_48
- Track 5 : Hexbug\_26, Nodigi\_26, Orla\_26
- Track 6 : Margaret\_27
- Track 7 : Button\_25, Jamzy\_27
- Track 8 : GiKK\_27
- Track 9 : Yakult\_25
- Track 10 : RanchParmCat\_27
- Track 11 : UmaThurman\_24, Delian\_24, Barco\_24, Melba\_24, Zarbodnamra\_24, JasperJr\_24, Malachai\_25, Fenry\_23, Archis\_25, Samba\_24, BlingBling\_24, Hitter\_24, Guacamole\_24, PhrostedPhlake\_26, Utz\_24, Jalammah\_26, Begonia\_25, MintFen\_24, Wisp\_23, Walrus\_26, Lysidious\_25, Mellie\_23, CaptainKirk2\_24
- Track 12 : Gambino\_26, Blueberry\_26, Azula\_26, MissRona\_26
- Track 13 : Frokostdame\_24
- Track 14 : Pipp\_24, Bunnybear\_23
- Track 15 : Murp\_25
- Track 16 : BeeGee\_25, Confidence\_25, ODay\_31, Cashline\_25, Denise\_21
- Track 17 : Jablanski\_27, Pytheas\_27, Posh\_27, Wrigley\_27
- Track 18 : Invectra\_25
- Track 19 : Dorito\_23, PhriskyACE\_23
- Track 20 : Kiko\_26
- Track 21 : Belphegor\_44
- Track 22 : Ailee\_41, Sedona\_44, Keitabear\_44
- Track 23 : RiverRaider\_45
- Track 24 : Bibwit\_43
- Track 25 : Hans\_45, Inspectinfecti\_44, Leonard\_43, Phinally\_43, Ali17\_41
- Track 26 : EMoore\_41
- Track 27 : MelBins\_44
- Track 28 : Phauci\_36
- Track 29 : PhorbesPhlower\_23, Morkie\_23
- Track 30 : Malibo\_26
- Track 31 : Tonitrus\_34

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

The start number called the most often in the published annotations is 7, it was called in 57 of the 71 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Ailee\_41, Ali17\_41, Archis\_25, Azula\_26, Barco\_24, BeeGee\_25, Begonia\_25, Belphegor\_44, Bibwit\_43, BlingBling\_24, Blueberry\_26, Bunnybear\_23, CaptainKirk2\_24, Cashline\_25, Confidence\_25, Delian\_24, Denise\_21, Dorito\_23, Fenry\_23, Frokostdame\_24, Gambino\_26, Guacamole\_24, Hans\_45, Hitter\_24, Inspectinfecti\_44, Invectra\_25, Jablanski\_27, Jalammah\_26, JasperJr\_24, Keitabear\_44, Kiko\_26, Leonard\_43, Lysidious\_25, Malachai\_25, Malibo\_26, MelBins\_44, Melba\_24, Mellie\_23, MintFen\_24, MissRona\_26, Morkie\_23, Murp\_25, ODay\_31, Phauci\_36, Phinally\_43, PhorbesPhlower\_23, PhriskyACE\_23, PhrostedPhlake\_26, Pipp\_24, Posh\_27, Pytheas\_27, RiverRaider\_45, Samba\_24, Sedona\_44, Trine\_23, UmaThurman\_24, Utz\_24, Walrus\_26, Wisp\_23, Wrigley\_27, Zarbodnamra\_24,

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

- Button\_25, EMoore\_41, GiKK\_27, Jamzy\_27, Yakult\_25,

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

- Amo99\_49, Clawz\_48, ColdSoup\_49, DonTron\_48, Hexbug\_26, Jollymon\_49, KingstonB\_49, Margaret\_27, Nodigi\_26, Orla\_26, RanchParmCat\_27, Soos\_44, Sting\_47, Tonitrus\_34,

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

Start 7:

- Found in 66 of 80 ( 82.5% ) of genes in pham
- Manual Annotations of this start: 57 of 71
- Called 92.4% of time when present
- Phage (with cluster) where this start called: Ailee\_41 (DE1), Ali17\_41 (DE2), Archis\_25 (CV), Azula\_26 (CV), Barco\_24 (CV), BeeGee\_25 (CY), Begonia\_25 (CV), Belphegor\_44 (DE), Bibwit\_43 (DE1), BlingBling\_24 (CV), Blueberry\_26 (CV), Bunnybear\_23 (CZ), CaptainKirk2\_24 (CV), Cashline\_25 (CY), Confidence\_25 (CY1), Delian\_24 (CV), Denise\_21 (CZ5), Dorito\_23 (CZ4), Fenry\_23 (CV), Frokostdame\_24 (CV), Gambino\_26 (CV), Guacamole\_24 (CV), Hans\_45 (DE2), Hitter\_24 (CV), Inspectinfecti\_44 (DE2), Invectra\_25 (CZ4), Jablanski\_27 (CY), Jalammah\_26 (CV), JasperJr\_24 (CV), Keitabear\_44 (DE1), Kiko\_26 (DB), Leonard\_43 (DE2), Lysidious\_25 (CV), Malachai\_25 (CV), Malibo\_26 (DW), MelBins\_44 (DE2), Melba\_24 (CV), Mellie\_23 (CV), MintFen\_24 (CV), MissRona\_26 (CV), Morkie\_23 (DH), Murp\_25 (CV), ODay\_31 (DN), Phauci\_36 (DE2), Phinally\_43 (DE2), PhorbesPhlower\_23 (DH), PhriskyACE\_23 (CZ4), PhrostedPhlake\_26 (CV), Pipp\_24 (CV), Posh\_27 (CY), Pytheas\_27 (CY), RiverRaider\_45 (DE1), Samba\_24 (CV), Sedona\_44 (DE1), Trine\_23 (CD), UmaThurman\_24 (CV), Utz\_24 (CV), Walrus\_26 (CV), Wisp\_23 (CV), Wrigley\_27 (CY), Zarbodnamra\_24 (CV),

Start 8:

- Found in 18 of 80 ( 22.5% ) of genes in pham
- Manual Annotations of this start: 13 of 71
- Called 100.0% of time when present

- Phage (with cluster) where this start called: Amo99\_49 (CP), Button\_25 (CT), Clawz\_48 (CP), ColdSoup\_49 (CP), DonTron\_48 (CP), GiKK\_27 (CT), Hexbug\_26 (CT), Jamzy\_27 (CT), Jollymon\_49 (CP), KingstonB\_49 (CP), Margaret\_27 (CT), Nodigi\_26 (CT), Orla\_26 (CT), RanchParmCat\_27 (CT), Soos\_44 (CP), Sting\_47 (CP), Tonitrus\_34 (singleton), Yakult\_25 (CT),

Start 9:

- Found in 1 of 80 ( 1.2% ) of genes in pham
- Manual Annotations of this start: 1 of 71
- Called 100.0% of time when present
- Phage (with cluster) where this start called: EMoore\_41 (DE2),

### Summary by clusters:

There are 17 clusters represented in this pham: DN, CY1, DH, DE1, DE2, DE, DB, singleton, CZ4, CD, CZ, CY, DW, CP, CZ5, CV, CT,

Info for manual annotations of cluster CD:

- Start number 7 was manually annotated 1 time for cluster CD.

Info for manual annotations of cluster CP:

- Start number 8 was manually annotated 3 times for cluster CP.

Info for manual annotations of cluster CT:

- Start number 8 was manually annotated 9 times for cluster CT.

Info for manual annotations of cluster CV:

- Start number 7 was manually annotated 29 times for cluster CV.

Info for manual annotations of cluster CY:

- Start number 7 was manually annotated 6 times for cluster CY.

Info for manual annotations of cluster CY1:

- Start number 7 was manually annotated 1 time for cluster CY1.

Info for manual annotations of cluster CZ:

- Start number 7 was manually annotated 1 time for cluster CZ.

Info for manual annotations of cluster CZ4:

- Start number 7 was manually annotated 1 time for cluster CZ4.

Info for manual annotations of cluster CZ5:

- Start number 7 was manually annotated 1 time for cluster CZ5.

Info for manual annotations of cluster DB:

- Start number 7 was manually annotated 1 time for cluster DB.

Info for manual annotations of cluster DE1:

- Start number 7 was manually annotated 5 times for cluster DE1.

Info for manual annotations of cluster DE2:

- Start number 7 was manually annotated 7 times for cluster DE2.

- Start number 9 was manually annotated 1 time for cluster DE2.

Info for manual annotations of cluster DH:

- Start number 7 was manually annotated 2 times for cluster DH.

Info for manual annotations of cluster DN:

- Start number 7 was manually annotated 1 time for cluster DN.

Info for manual annotations of cluster DW:

- Start number 7 was manually annotated 1 time for cluster DW.

### **Gene Information:**

Gene: Ailee\_41 Start: 38585, Stop: 39043, Start Num: 7

Candidate Starts for Ailee\_41:

(Start: 7 @38585 has 57 MA's), (22, 38663), (27, 38699), (28, 38705), (35, 38744), (49, 38795), (66, 38930),

Gene: Ali17\_41 Start: 37879, Stop: 38337, Start Num: 7

Candidate Starts for Ali17\_41:

(Start: 7 @37879 has 57 MA's), (22, 37957), (27, 37993), (28, 37999), (35, 38038), (43, 38068), (49, 38089), (55, 38137),

Gene: Amo99\_49 Start: 26503, Stop: 26979, Start Num: 8

Candidate Starts for Amo99\_49:

(Start: 8 @26503 has 13 MA's), (43, 26680), (47, 26692), (55, 26749), (58, 26779), (72, 26914), (73, 26917),

Gene: Archis\_25 Start: 20911, Stop: 21369, Start Num: 7

Candidate Starts for Archis\_25:

(Start: 7 @20911 has 57 MA's), (18, 20974), (24, 21010), (27, 21025), (28, 21031), (33, 21058), (40, 21088), (43, 21100), (46, 21109), (55, 21169), (66, 21256), (67, 21262),

Gene: Azula\_26 Start: 21012, Stop: 21470, Start Num: 7

Candidate Starts for Azula\_26:

(Start: 7 @21012 has 57 MA's), (24, 21111), (27, 21126), (33, 21159), (43, 21201), (46, 21210), (55, 21270), (66, 21357), (67, 21363),

Gene: Barco\_24 Start: 20700, Stop: 21158, Start Num: 7

Candidate Starts for Barco\_24:

(Start: 7 @20700 has 57 MA's), (18, 20763), (24, 20799), (27, 20814), (28, 20820), (33, 20847), (40, 20877), (43, 20889), (46, 20898), (55, 20958), (66, 21045), (67, 21051),

Gene: BeeGee\_25 Start: 21331, Stop: 21789, Start Num: 7

Candidate Starts for BeeGee\_25:

(Start: 7 @21331 has 57 MA's), (17, 21391), (22, 21409), (28, 21451), (32, 21475), (33, 21478), (35, 21490), (38, 21502), (43, 21520), (44, 21523), (45, 21526), (47, 21532), (55, 21589), (69, 21688), (73, 21727),

Gene: Begonia\_25 Start: 21181, Stop: 21639, Start Num: 7

Candidate Starts for Begonia\_25:

(Start: 7 @21181 has 57 MA's), (18, 21244), (24, 21280), (27, 21295), (28, 21301), (33, 21328), (40, 21358), (43, 21370), (46, 21379), (55, 21439), (66, 21526), (67, 21532),

Gene: Belphegor\_44 Start: 39930, Stop: 40388, Start Num: 7

Candidate Starts for Belphegor\_44:

(Start: 7 @39930 has 57 MA's), (15, 39972), (22, 40008), (24, 40029), (27, 40044), (28, 40050), (43, 40119), (49, 40140),

Gene: Bibwit\_43 Start: 38519, Stop: 38980, Start Num: 7

Candidate Starts for Bibwit\_43:

(Start: 7 @38519 has 57 MA's), (22, 38597), (24, 38618), (27, 38633), (28, 38639), (39, 38693), (43, 38708), (49, 38729),

Gene: BlingBling\_24 Start: 20700, Stop: 21158, Start Num: 7

Candidate Starts for BlingBling\_24:

(Start: 7 @20700 has 57 MA's), (18, 20763), (24, 20799), (27, 20814), (28, 20820), (33, 20847), (40, 20877), (43, 20889), (46, 20898), (55, 20958), (66, 21045), (67, 21051),

Gene: Blueberry\_26 Start: 21012, Stop: 21470, Start Num: 7

Candidate Starts for Blueberry\_26:

(Start: 7 @21012 has 57 MA's), (24, 21111), (27, 21126), (33, 21159), (43, 21201), (46, 21210), (55, 21270), (66, 21357), (67, 21363),

Gene: Bunnybear\_23 Start: 21777, Stop: 22235, Start Num: 7

Candidate Starts for Bunnybear\_23:

(Start: 7 @21777 has 57 MA's), (18, 21840), (24, 21876), (27, 21891), (28, 21897), (33, 21924), (40, 21954), (43, 21966), (46, 21975), (55, 22035), (67, 22128),

Gene: Button\_25 Start: 19038, Stop: 19490, Start Num: 8

Candidate Starts for Button\_25:

(2, 18999), (6, 19029), (Start: 7 @19032 has 57 MA's), (Start: 8 @19038 has 13 MA's), (11, 19053), (26, 19137), (27, 19143), (31, 19158), (41, 19203), (47, 19224), (51, 19239), (60, 19347), (75, 19446),

Gene: CaptainKirk2\_24 Start: 20721, Stop: 21179, Start Num: 7

Candidate Starts for CaptainKirk2\_24:

(Start: 7 @20721 has 57 MA's), (18, 20784), (24, 20820), (27, 20835), (28, 20841), (33, 20868), (40, 20898), (43, 20910), (46, 20919), (55, 20979), (66, 21066), (67, 21072),

Gene: Cashline\_25 Start: 21198, Stop: 21656, Start Num: 7

Candidate Starts for Cashline\_25:

(Start: 7 @21198 has 57 MA's), (17, 21258), (22, 21276), (28, 21318), (32, 21342), (33, 21345), (35, 21357), (38, 21369), (43, 21387), (44, 21390), (45, 21393), (47, 21399), (55, 21456), (69, 21555), (73, 21594),

Gene: Clawz\_48 Start: 26409, Stop: 26885, Start Num: 8

Candidate Starts for Clawz\_48:

(Start: 8 @26409 has 13 MA's), (12, 26430), (21, 26478), (25, 26505), (37, 26568), (43, 26586), (68, 26760), (72, 26820),

Gene: ColdSoup\_49 Start: 26503, Stop: 26979, Start Num: 8

Candidate Starts for ColdSoup\_49:

(Start: 8 @26503 has 13 MA's), (43, 26680), (47, 26692), (55, 26749), (58, 26779), (72, 26914), (73, 26917),

Gene: Confidence\_25 Start: 21361, Stop: 21819, Start Num: 7

Candidate Starts for Confidence\_25:

(Start: 7 @21361 has 57 MA's), (17, 21421), (22, 21439), (28, 21481), (32, 21505), (33, 21508), (35, 21520), (38, 21532), (43, 21550), (44, 21553), (45, 21556), (47, 21562), (55, 21619), (69, 21718), (73, 21757),

Gene: Delian\_24 Start: 20721, Stop: 21179, Start Num: 7

Candidate Starts for Delian\_24:

(Start: 7 @20721 has 57 MA's), (18, 20784), (24, 20820), (27, 20835), (28, 20841), (33, 20868), (40, 20898), (43, 20910), (46, 20919), (55, 20979), (66, 21066), (67, 21072),

Gene: Denise\_21 Start: 18426, Stop: 18884, Start Num: 7

Candidate Starts for Denise\_21:

(Start: 7 @18426 has 57 MA's), (17, 18486), (22, 18504), (28, 18546), (32, 18570), (33, 18573), (35, 18585), (38, 18597), (43, 18615), (44, 18618), (45, 18621), (47, 18627), (55, 18684), (69, 18783), (73, 18822),

Gene: DonTron\_48 Start: 26543, Stop: 27019, Start Num: 8

Candidate Starts for DonTron\_48:

(Start: 8 @26543 has 13 MA's), (43, 26720), (47, 26732), (55, 26789), (57, 26810), (58, 26819), (72, 26954),

Gene: Dorito\_23 Start: 20203, Stop: 20682, Start Num: 7

Candidate Starts for Dorito\_23:

(Start: 7 @20203 has 57 MA's), (10, 20218), (17, 20263), (20, 20275), (24, 20302), (27, 20317), (28, 20323), (40, 20380), (41, 20383), (42, 20386), (43, 20392), (66, 20569), (73, 20620),

Gene: EMoore\_41 Start: 39068, Stop: 39517, Start Num: 9

Candidate Starts for EMoore\_41:

(Start: 7 @39059 has 57 MA's), (Start: 9 @39068 has 1 MA's), (27, 39173), (28, 39179), (35, 39218), (43, 39248), (49, 39269),

Gene: Fenry\_23 Start: 20419, Stop: 20877, Start Num: 7

Candidate Starts for Fenry\_23:

(Start: 7 @20419 has 57 MA's), (18, 20482), (24, 20518), (27, 20533), (28, 20539), (33, 20566), (40, 20596), (43, 20608), (46, 20617), (55, 20677), (66, 20764), (67, 20770),

Gene: Frokostdame\_24 Start: 20666, Stop: 21124, Start Num: 7

Candidate Starts for Frokostdame\_24:

(Start: 7 @20666 has 57 MA's), (12, 20693), (24, 20765), (27, 20780), (33, 20813), (43, 20855), (46, 20864), (55, 20924), (66, 21011), (67, 21017),

Gene: Gambino\_26 Start: 21012, Stop: 21470, Start Num: 7

Candidate Starts for Gambino\_26:

(Start: 7 @21012 has 57 MA's), (24, 21111), (27, 21126), (33, 21159), (43, 21201), (46, 21210), (55, 21270), (66, 21357), (67, 21363),

Gene: GiKK\_27 Start: 19337, Stop: 19789, Start Num: 8

Candidate Starts for GiKK\_27:

(2, 19298), (6, 19328), (Start: 7 @19331 has 57 MA's), (Start: 8 @19337 has 13 MA's), (11, 19352), (26, 19436), (41, 19502), (47, 19523), (51, 19538), (57, 19622), (60, 19646), (63, 19673), (74, 19739), (75, 19745),

Gene: Guacamole\_24 Start: 20704, Stop: 21162, Start Num: 7

Candidate Starts for Guacamole\_24:

(Start: 7 @20704 has 57 MA's), (18, 20767), (24, 20803), (27, 20818), (28, 20824), (33, 20851), (40, 20881), (43, 20893), (46, 20902), (55, 20962), (66, 21049), (67, 21055),

Gene: Hans\_45 Start: 38519, Stop: 38977, Start Num: 7

Candidate Starts for Hans\_45:

(Start: 7 @38519 has 57 MA's), (22, 38597), (27, 38633), (28, 38639), (35, 38678), (43, 38708), (49, 38729), (55, 38777),

Gene: Hexbug\_26 Start: 20025, Stop: 20471, Start Num: 8

Candidate Starts for Hexbug\_26:

(Start: 8 @20025 has 13 MA's), (13, 20049), (23, 20103), (37, 20172), (39, 20178), (46, 20202), (56, 20286), (62, 20337), (64, 20358), (69, 20379), (75, 20427), (76, 20430),

Gene: Hitter\_24 Start: 20700, Stop: 21158, Start Num: 7

Candidate Starts for Hitter\_24:

(Start: 7 @20700 has 57 MA's), (18, 20763), (24, 20799), (27, 20814), (28, 20820), (33, 20847), (40, 20877), (43, 20889), (46, 20898), (55, 20958), (66, 21045), (67, 21051),

Gene: Inspectinfecti\_44 Start: 38965, Stop: 39423, Start Num: 7

Candidate Starts for Inspectinfecti\_44:

(Start: 7 @38965 has 57 MA's), (22, 39043), (27, 39079), (28, 39085), (35, 39124), (43, 39154), (49, 39175), (55, 39223),

Gene: Invectra\_25 Start: 21068, Stop: 21547, Start Num: 7

Candidate Starts for Invectra\_25:

(Start: 7 @21068 has 57 MA's), (10, 21083), (17, 21128), (20, 21140), (24, 21167), (27, 21182), (28, 21188), (40, 21245), (41, 21248), (42, 21251), (43, 21257), (73, 21485),

Gene: Jablanski\_27 Start: 22440, Stop: 22898, Start Num: 7

Candidate Starts for Jablanski\_27:

(Start: 7 @22440 has 57 MA's), (17, 22500), (22, 22518), (27, 22554), (28, 22560), (32, 22584), (33, 22587), (35, 22599), (38, 22611), (43, 22629), (44, 22632), (45, 22635), (47, 22641), (55, 22698), (67, 22791), (69, 22797),

Gene: Jalammah\_26 Start: 21494, Stop: 21952, Start Num: 7

Candidate Starts for Jalammah\_26:

(Start: 7 @21494 has 57 MA's), (18, 21557), (24, 21593), (27, 21608), (28, 21614), (33, 21641), (40, 21671), (43, 21683), (46, 21692), (55, 21752), (66, 21839), (67, 21845),

Gene: Jamzy\_27 Start: 19351, Stop: 19803, Start Num: 8

Candidate Starts for Jamzy\_27:

(2, 19312), (6, 19342), (Start: 7 @19345 has 57 MA's), (Start: 8 @19351 has 13 MA's), (11, 19366), (26, 19450), (27, 19456), (31, 19471), (41, 19516), (47, 19537), (51, 19552), (60, 19660), (75, 19759),

Gene: JasperJr\_24 Start: 20704, Stop: 21162, Start Num: 7

Candidate Starts for JasperJr\_24:

(Start: 7 @20704 has 57 MA's), (18, 20767), (24, 20803), (27, 20818), (28, 20824), (33, 20851), (40, 20881), (43, 20893), (46, 20902), (55, 20962), (66, 21049), (67, 21055),

Gene: Jollymon\_49 Start: 26503, Stop: 26979, Start Num: 8



Candidate Starts for Jollymon\_49:

(Start: 8 @26503 has 13 MA's), (43, 26680), (47, 26692), (55, 26749), (58, 26779), (72, 26914), (73, 26917),

Gene: Keitabear\_44 Start: 40216, Stop: 40674, Start Num: 7

Candidate Starts for Keitabear\_44:

(Start: 7 @40216 has 57 MA's), (22, 40294), (27, 40330), (28, 40336), (35, 40375), (49, 40426), (66, 40561),

Gene: Kiko\_26 Start: 20953, Stop: 21411, Start Num: 7

Candidate Starts for Kiko\_26:

(Start: 7 @20953 has 57 MA's), (18, 21016), (19, 21019), (22, 21031), (24, 21052), (27, 21067), (32, 21097), (46, 21151), (47, 21154), (50, 21166), (59, 21253), (73, 21349),

Gene: KingstonB\_49 Start: 25981, Stop: 26457, Start Num: 8

Candidate Starts for KingstonB\_49:

(Start: 8 @25981 has 13 MA's), (43, 26158), (47, 26170), (55, 26227), (57, 26248), (58, 26257), (72, 26392),

Gene: Leonard\_43 Start: 38604, Stop: 39062, Start Num: 7

Candidate Starts for Leonard\_43:

(Start: 7 @38604 has 57 MA's), (22, 38682), (27, 38718), (28, 38724), (35, 38763), (43, 38793), (49, 38814), (55, 38862),

Gene: Lysidious\_25 Start: 21224, Stop: 21682, Start Num: 7

Candidate Starts for Lysidious\_25:

(Start: 7 @21224 has 57 MA's), (18, 21287), (24, 21323), (27, 21338), (28, 21344), (33, 21371), (40, 21401), (43, 21413), (46, 21422), (55, 21482), (66, 21569), (67, 21575),

Gene: Malachai\_25 Start: 21181, Stop: 21639, Start Num: 7

Candidate Starts for Malachai\_25:

(Start: 7 @21181 has 57 MA's), (18, 21244), (24, 21280), (27, 21295), (28, 21301), (33, 21328), (40, 21358), (43, 21370), (46, 21379), (55, 21439), (66, 21526), (67, 21532),

Gene: Malibo\_26 Start: 20919, Stop: 21377, Start Num: 7

Candidate Starts for Malibo\_26:

(Start: 7 @20919 has 57 MA's), (13, 20949), (18, 20982), (24, 21018), (27, 21033), (28, 21039), (33, 21066), (40, 21096), (42, 21102), (43, 21108), (46, 21117), (50, 21132), (55, 21177), (62, 21231), (72, 21312),

Gene: Margaret\_27 Start: 19721, Stop: 20167, Start Num: 8

Candidate Starts for Margaret\_27:

(1, 19619), (2, 19676), (Start: 8 @19721 has 13 MA's), (14, 19754), (16, 19763), (34, 19856), (38, 19874), (40, 19880), (52, 19922), (53, 19943), (54, 19949), (56, 19985), (58, 20012), (61, 20030), (70, 20084),

Gene: MelBins\_44 Start: 38751, Stop: 39209, Start Num: 7

Candidate Starts for MelBins\_44:

(Start: 7 @38751 has 57 MA's), (22, 38829), (24, 38850), (27, 38865), (28, 38871), (35, 38910), (43, 38940), (49, 38961),

Gene: Melba\_24 Start: 20700, Stop: 21158, Start Num: 7

Candidate Starts for Melba\_24:

(Start: 7 @20700 has 57 MA's), (18, 20763), (24, 20799), (27, 20814), (28, 20820), (33, 20847), (40, 20877), (43, 20889), (46, 20898), (55, 20958), (66, 21045), (67, 21051),

Gene: Mellie\_23 Start: 20461, Stop: 20919, Start Num: 7

Candidate Starts for Mellie\_23:

(Start: 7 @20461 has 57 MA's), (18, 20524), (24, 20560), (27, 20575), (28, 20581), (33, 20608), (40, 20638), (43, 20650), (46, 20659), (55, 20719), (66, 20806), (67, 20812),

Gene: MintFen\_24 Start: 20700, Stop: 21158, Start Num: 7

Candidate Starts for MintFen\_24:

(Start: 7 @20700 has 57 MA's), (18, 20763), (24, 20799), (27, 20814), (28, 20820), (33, 20847), (40, 20877), (43, 20889), (46, 20898), (55, 20958), (66, 21045), (67, 21051),

Gene: MissRona\_26 Start: 21012, Stop: 21470, Start Num: 7

Candidate Starts for MissRona\_26:

(Start: 7 @21012 has 57 MA's), (24, 21111), (27, 21126), (33, 21159), (43, 21201), (46, 21210), (55, 21270), (66, 21357), (67, 21363),

Gene: Morkie\_23 Start: 18982, Stop: 19440, Start Num: 7

Candidate Starts for Morkie\_23:

(Start: 7 @18982 has 57 MA's), (18, 19045), (24, 19081), (27, 19096), (33, 19129), (40, 19159), (42, 19165), (46, 19180), (55, 19240), (69, 19339), (73, 19378),

Gene: Murp\_25 Start: 20968, Stop: 21426, Start Num: 7

Candidate Starts for Murp\_25:

(Start: 7 @20968 has 57 MA's), (18, 21031), (24, 21067), (27, 21082), (33, 21115), (40, 21145), (46, 21166), (55, 21226), (66, 21313), (67, 21319),

Gene: Nodigi\_26 Start: 19994, Stop: 20440, Start Num: 8

Candidate Starts for Nodigi\_26:

(Start: 8 @19994 has 13 MA's), (13, 20018), (23, 20072), (37, 20141), (39, 20147), (46, 20171), (56, 20255), (62, 20306), (64, 20327), (69, 20348), (75, 20396), (76, 20399),

Gene: ODay\_31 Start: 22917, Stop: 23375, Start Num: 7

Candidate Starts for ODay\_31:

(Start: 7 @22917 has 57 MA's), (17, 22977), (22, 22995), (28, 23037), (32, 23061), (33, 23064), (35, 23076), (38, 23088), (43, 23106), (44, 23109), (45, 23112), (47, 23118), (55, 23175), (69, 23274), (73, 23313),

Gene: Orla\_26 Start: 19998, Stop: 20444, Start Num: 8

Candidate Starts for Orla\_26:

(Start: 8 @19998 has 13 MA's), (13, 20022), (23, 20076), (37, 20145), (39, 20151), (46, 20175), (56, 20259), (62, 20310), (64, 20331), (69, 20352), (75, 20400), (76, 20403),

Gene: Phauci\_36 Start: 35454, Stop: 35912, Start Num: 7

Candidate Starts for Phauci\_36:

(Start: 7 @35454 has 57 MA's), (22, 35532), (24, 35553), (26, 35562), (27, 35568), (49, 35664),

Gene: Phinally\_43 Start: 38601, Stop: 39059, Start Num: 7

Candidate Starts for Phinally\_43:

(Start: 7 @38601 has 57 MA's), (22, 38679), (27, 38715), (28, 38721), (35, 38760), (43, 38790), (49, 38811), (55, 38859),

Gene: PhorbesPhlower\_23 Start: 18982, Stop: 19440, Start Num: 7  
Candidate Starts for PhorbesPhlower\_23:  
(Start: 7 @18982 has 57 MA's), (18, 19045), (24, 19081), (27, 19096), (33, 19129), (40, 19159), (42, 19165), (46, 19180), (55, 19240), (69, 19339), (73, 19378),

Gene: PhriskyACE\_23 Start: 20203, Stop: 20682, Start Num: 7  
Candidate Starts for PhriskyACE\_23:  
(Start: 7 @20203 has 57 MA's), (10, 20218), (17, 20263), (20, 20275), (24, 20302), (27, 20317), (28, 20323), (40, 20380), (41, 20383), (42, 20386), (43, 20392), (66, 20569), (73, 20620),

Gene: PhrostedPhlake\_26 Start: 21393, Stop: 21851, Start Num: 7  
Candidate Starts for PhrostedPhlake\_26:  
(Start: 7 @21393 has 57 MA's), (18, 21456), (24, 21492), (27, 21507), (28, 21513), (33, 21540), (40, 21570), (43, 21582), (46, 21591), (55, 21651), (66, 21738), (67, 21744),

Gene: Pipp\_24 Start: 20694, Stop: 21152, Start Num: 7  
Candidate Starts for Pipp\_24:  
(Start: 7 @20694 has 57 MA's), (18, 20757), (24, 20793), (27, 20808), (28, 20814), (33, 20841), (40, 20871), (43, 20883), (46, 20892), (55, 20952), (67, 21045),

Gene: Posh\_27 Start: 22293, Stop: 22751, Start Num: 7  
Candidate Starts for Posh\_27:  
(Start: 7 @22293 has 57 MA's), (17, 22353), (22, 22371), (27, 22407), (28, 22413), (32, 22437), (33, 22440), (35, 22452), (38, 22464), (43, 22482), (44, 22485), (45, 22488), (47, 22494), (55, 22551), (67, 22644), (69, 22650),

Gene: Pytheas\_27 Start: 22439, Stop: 22897, Start Num: 7  
Candidate Starts for Pytheas\_27:  
(Start: 7 @22439 has 57 MA's), (17, 22499), (22, 22517), (27, 22553), (28, 22559), (32, 22583), (33, 22586), (35, 22598), (38, 22610), (43, 22628), (44, 22631), (45, 22634), (47, 22640), (55, 22697), (67, 22790), (69, 22796),

Gene: RanchParmCat\_27 Start: 19721, Stop: 20167, Start Num: 8  
Candidate Starts for RanchParmCat\_27:  
(1, 19619), (2, 19676), (3, 19694), (Start: 8 @19721 has 13 MA's), (14, 19754), (16, 19763), (34, 19856), (36, 19865), (38, 19874), (40, 19880), (52, 19922), (53, 19943), (56, 19985), (58, 20012), (61, 20030), (70, 20084),

Gene: RiverRaider\_45 Start: 38134, Stop: 38592, Start Num: 7  
Candidate Starts for RiverRaider\_45:  
(Start: 7 @38134 has 57 MA's), (14, 38173), (22, 38212), (27, 38248), (32, 38278), (43, 38323), (49, 38344), (72, 38527),

Gene: Samba\_24 Start: 20778, Stop: 21236, Start Num: 7  
Candidate Starts for Samba\_24:  
(Start: 7 @20778 has 57 MA's), (18, 20841), (24, 20877), (27, 20892), (28, 20898), (33, 20925), (40, 20955), (43, 20967), (46, 20976), (55, 21036), (66, 21123), (67, 21129),

Gene: Sedona\_44 Start: 39952, Stop: 40410, Start Num: 7  
Candidate Starts for Sedona\_44:  
(Start: 7 @39952 has 57 MA's), (22, 40030), (27, 40066), (28, 40072), (35, 40111), (49, 40162), (66, 40297),

Gene: Soos\_44 Start: 25710, Stop: 26186, Start Num: 8  
Candidate Starts for Soos\_44:  
(Start: 8 @25710 has 13 MA's), (43, 25887), (47, 25899), (55, 25956), (57, 25977), (58, 25986), (72, 26121),

Gene: Sting\_47 Start: 26149, Stop: 26625, Start Num: 8  
Candidate Starts for Sting\_47:  
(Start: 8 @26149 has 13 MA's), (43, 26326), (47, 26338), (55, 26395), (57, 26416), (58, 26425), (72, 26560),

Gene: Tonitrus\_34 Start: 22668, Stop: 23153, Start Num: 8  
Candidate Starts for Tonitrus\_34:  
(4, 22653), (5, 22656), (6, 22659), (Start: 8 @22668 has 13 MA's), (15, 22704), (22, 22740), (29, 22788), (30, 22791), (36, 22821), (47, 22860), (50, 22872), (65, 22995), (71, 23052),

Gene: Trine\_23 Start: 18593, Stop: 19054, Start Num: 7  
Candidate Starts for Trine\_23:  
(6, 18590), (Start: 7 @18593 has 57 MA's), (18, 18656), (20, 18665), (24, 18692), (26, 18701), (43, 18782), (46, 18791), (48, 18800),

Gene: UmaThurman\_24 Start: 20825, Stop: 21283, Start Num: 7  
Candidate Starts for UmaThurman\_24:  
(Start: 7 @20825 has 57 MA's), (18, 20888), (24, 20924), (27, 20939), (28, 20945), (33, 20972), (40, 21002), (43, 21014), (46, 21023), (55, 21083), (66, 21170), (67, 21176),

Gene: Utz\_24 Start: 20695, Stop: 21153, Start Num: 7  
Candidate Starts for Utz\_24:  
(Start: 7 @20695 has 57 MA's), (18, 20758), (24, 20794), (27, 20809), (28, 20815), (33, 20842), (40, 20872), (43, 20884), (46, 20893), (55, 20953), (66, 21040), (67, 21046),

Gene: Walrus\_26 Start: 21240, Stop: 21698, Start Num: 7  
Candidate Starts for Walrus\_26:  
(Start: 7 @21240 has 57 MA's), (18, 21303), (24, 21339), (27, 21354), (28, 21360), (33, 21387), (40, 21417), (43, 21429), (46, 21438), (55, 21498), (66, 21585), (67, 21591),

Gene: Wisp\_23 Start: 20410, Stop: 20868, Start Num: 7  
Candidate Starts for Wisp\_23:  
(Start: 7 @20410 has 57 MA's), (18, 20473), (24, 20509), (27, 20524), (28, 20530), (33, 20557), (40, 20587), (43, 20599), (46, 20608), (55, 20668), (66, 20755), (67, 20761),

Gene: Wrigley\_27 Start: 22190, Stop: 22648, Start Num: 7  
Candidate Starts for Wrigley\_27:  
(Start: 7 @22190 has 57 MA's), (17, 22250), (22, 22268), (27, 22304), (28, 22310), (32, 22334), (33, 22337), (35, 22349), (38, 22361), (43, 22379), (44, 22382), (45, 22385), (47, 22391), (55, 22448), (67, 22541), (69, 22547),

Gene: Yakult\_25 Start: 19569, Stop: 20021, Start Num: 8  
Candidate Starts for Yakult\_25:  
(1, 19473), (2, 19530), (6, 19560), (Start: 7 @19563 has 57 MA's), (Start: 8 @19569 has 13 MA's), (11, 19584), (13, 19593), (14, 19602), (31, 19689), (34, 19707), (39, 19728), (47, 19755), (51, 19770), (58, 19863), (60, 19878), (61, 19881), (75, 19977),

Gene: Zarbodnamra\_24 Start: 20699, Stop: 21157, Start Num: 7

Candidate Starts for Zarbodnamra\_24:

(Start: 7 @20699 has 57 MA's), (18, 20762), (24, 20798), (27, 20813), (28, 20819), (33, 20846), (40, 20876), (43, 20888), (46, 20897), (55, 20957), (66, 21044), (67, 21050),