



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 283774 Report

This analysis was run 02/23/26 on database version 636.

Pham number 283774 has 70 members, 14 are drafts.

Phages represented in each track:

- Track 1 : Maco6\_43
- Track 2 : FF47\_44A, Muddy\_45
- Track 3 : NoShow\_53
- Track 4 : 8UZL\_45
- Track 5 : Zuko\_77
- Track 6 : KimJongPhill\_79
- Track 7 : Nibbles\_40, MaVan\_41, Wolfwood\_43, Survivors\_41
- Track 8 : Carsonalex\_47, Axym\_43, RADical\_45, RedBaron\_46, Burnsey\_44, Nina\_43, Socotra\_45, Bubble\_42, Typhonomachy\_43
- Track 9 : Amok\_45
- Track 10 : Agatha\_44, Cozz\_42
- Track 11 : Jamzy\_49
- Track 12 : Yummy\_46, Troje\_46, Horseradish\_46, Blondies\_47, SketchMex\_44, Biskit\_46
- Track 13 : Emalyn\_43
- Track 14 : Button\_47
- Track 15 : PotPie\_45, Yucky\_48
- Track 16 : Sopespian\_42, Elliott\_44, PsychoKiller\_43, Starburst\_44
- Track 17 : Buttrmlkdreams\_46
- Track 18 : Fribs8\_40
- Track 19 : GoldHunter\_45
- Track 20 : Dre3\_39, Gibbous\_39
- Track 21 : MunkgeeRoachy\_42
- Track 22 : MScarn\_48
- Track 23 : AndPeggy\_41, SteamedHams\_44, Yarn\_41
- Track 24 : Tolls\_45
- Track 25 : Azira\_41, Zareef\_41
- Track 26 : Vine\_48
- Track 27 : Cleo\_39
- Track 28 : HippoPololi\_41
- Track 29 : BillDoor\_44
- Track 30 : Hexbug\_52, Orla\_52, Nodigi\_52
- Track 31 : AikoCarson\_45
- Track 32 : RanchParmCat\_49, Margaret\_50
- Track 33 : GTE2\_36
- Track 34 : Yakult\_47
- Track 35 : RSchmailzl\_45

- Track 36 : Quasar\_44
- Track 37 : GiKK\_49
- Track 38 : SweatNTears\_45
- Track 39 : Huwbert\_70
- Track 40 : Triscuit\_69
- Track 41 : Shrew\_78

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

The start number called the most often in the published annotations is 22, it was called in 31 of the 56 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- 8UZL\_45, Agatha\_44, AikoCarson\_45, Amok\_45, AndPeggy\_41, Axym\_43, BillDoor\_44, Bubble\_42, Burnsey\_44, Button\_47, Carsonalex\_47, Cozz\_42, Elliott\_44, Emalyn\_43, FF47\_44A, GTE2\_36, GiKK\_49, GoldHunter\_45, Hexbug\_52, Jamzy\_49, Maco6\_43, Margaret\_50, Muddy\_45, MunkgeeRoachy\_42, Nina\_43, NoShow\_53, Nodigi\_52, Orla\_52, PsychoKiller\_43, Quasar\_44, RADical\_45, RSchmailzl\_45, RanchParmCat\_49, RedBaron\_46, Shrew\_78, Socotra\_45, Sopespian\_42, Starburst\_44, SteamedHams\_44, SweatNTears\_45, Tolls\_45, Typhonmarchy\_43, Yakult\_47, Yarn\_41,

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

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

- Azira\_41, Biskit\_46, Blondies\_47, Buttrmlkdreams\_46, Cleo\_39, Dre3\_39, Fribs8\_40, Gibbous\_39, HippoPololi\_41, Horseradish\_46, Huwbert\_70, KimJongPhill\_79, MScarn\_48, MaVan\_41, Nibbles\_40, PotPie\_45, SketchMex\_44, Survivors\_41, Triscuit\_69, Troje\_46, Vine\_48, Wolfwood\_43, Yucky\_48, Yummy\_46, Zareef\_41, Zuko\_77,

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

Start 7:

- Found in 2 of 70 ( 2.9% ) 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: Huwbert\_70 (GG), Triscuit\_69 (GG),

Start 12:

- Found in 3 of 70 ( 4.3% ) of genes in pham
- Manual Annotations of this start: 3 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: PotPie\_45 (CT), Vine\_48 (CT), Yucky\_48 (CT),

Start 17:

- Found in 2 of 70 ( 2.9% ) of genes in pham
- Manual Annotations of this start: 1 of 56

- Called 50.0% of time when present
- Phage (with cluster) where this start called: Cleo\_39 (CT),

#### Start 20:

- Found in 8 of 70 ( 11.4% ) of genes in pham
- Manual Annotations of this start: 8 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Biskit\_46 (CT), Blondies\_47 (CT), Buttrmlkdreams\_46 (CT), Horseradish\_46 (CT), MScarn\_48 (CT), SketchMex\_44 (CT), Troje\_46 (CT), Yummy\_46 (CT),

#### Start 22:

- Found in 44 of 70 ( 62.9% ) of genes in pham
- Manual Annotations of this start: 31 of 56
- Called 100.0% of time when present
- Phage (with cluster) where this start called: 8UZL\_45 (AB), Agatha\_44 (CT), AikoCarson\_45 (CT), Amok\_45 (CT), AndPeggy\_41 (CT), Axym\_43 (CT), BillDoor\_44 (CT), Bubble\_42 (CT), Burnsey\_44 (CT), Button\_47 (CT), Carsonalex\_47 (CT), Cozz\_42 (CT), Elliott\_44 (CT), Emalyn\_43 (CT), FF47\_44A (AB), GTE2\_36 (CT), GiKK\_49 (CT), GoldHunter\_45 (CT), Hexbug\_52 (CT), Jamzy\_49 (CT), Maco6\_43 (AB), Margaret\_50 (CT), Muddy\_45 (AB), MunkgeeRoachy\_42 (CT), Nina\_43 (CT), NoShow\_53 (AB), Nodigi\_52 (CT), Orla\_52 (CT), PsychoKiller\_43 (CT), Quasar\_44 (CT), RADical\_45 (CT), RSchmailzl\_45 (CT), RanchParmCat\_49 (CT), RedBaron\_46 (CT), Shrew\_78 (singleton), Socotra\_45 (CT), Sopespian\_42 (CT), Starburst\_44 (CT), SteamedHams\_44 (CT), SweatNTears\_45 (CT), Tolls\_45 (CT), Typhonmacy\_43 (CT), Yakult\_47 (CT), Yarn\_41 (CT),

#### Start 23:

- Found in 9 of 70 ( 12.9% ) of genes in pham
- Manual Annotations of this start: 7 of 56
- Called 88.9% of time when present
- Phage (with cluster) where this start called: Azira\_41 (CT), Fribs8\_40 (CT), KimJongPhill\_79 (BR), MaVan\_41 (CT), Nibbles\_40 (CT), Survivors\_41 (CT), Wolfwood\_43 (CT), Zareef\_41 (CT),

#### Start 24:

- Found in 4 of 70 ( 5.7% ) of genes in pham
- Manual Annotations of this start: 3 of 56
- Called 75.0% of time when present
- Phage (with cluster) where this start called: Dre3\_39 (CT), Gibbous\_39 (CT), HippoPololi\_41 (CT),

#### Start 28:

- Found in 22 of 70 ( 31.4% ) of genes in pham
- Manual Annotations of this start: 1 of 56
- Called 4.5% of time when present
- Phage (with cluster) where this start called: Zuko\_77 (BR),

### Summary by clusters:

There are 5 clusters represented in this pham: GG, singleton, AB, BR, CT,

Info for manual annotations of cluster AB:

- Start number 22 was manually annotated 3 times for cluster AB.

Info for manual annotations of cluster BR:

- Start number 23 was manually annotated 1 time for cluster BR.
- Start number 28 was manually annotated 1 time for cluster BR.

Info for manual annotations of cluster CT:

- Start number 12 was manually annotated 3 times for cluster CT.
- Start number 17 was manually annotated 1 time for cluster CT.
- Start number 20 was manually annotated 8 times for cluster CT.
- Start number 22 was manually annotated 27 times for cluster CT.
- Start number 23 was manually annotated 6 times for cluster CT.
- Start number 24 was manually annotated 3 times for cluster CT.

Info for manual annotations of cluster GG:

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

### **Gene Information:**

Gene: 8UZL\_45 Start: 34790, Stop: 34248, Start Num: 22

Candidate Starts for 8UZL\_45:

(Start: 22 @34790 has 31 MA's), (26, 34763), (29, 34751), (33, 34706), (34, 34697), (37, 34673), (39, 34640), (58, 34484), (59, 34478), (70, 34397),

Gene: Agatha\_44 Start: 33075, Stop: 32551, Start Num: 22

Candidate Starts for Agatha\_44:

(13, 33123), (14, 33120), (Start: 22 @33075 has 31 MA's), (35, 32976), (39, 32925), (49, 32829), (54, 32790), (62, 32748), (72, 32673), (82, 32631),

Gene: AikoCarson\_45 Start: 33253, Stop: 32798, Start Num: 22

Candidate Starts for AikoCarson\_45:

(14, 33298), (Start: 22 @33253 has 31 MA's), (35, 33154), (36, 33139), (44, 33046), (49, 33007), (54, 32968), (56, 32953), (58, 32947), (67, 32884),

Gene: Amok\_45 Start: 33277, Stop: 32822, Start Num: 22

Candidate Starts for Amok\_45:

(Start: 22 @33277 has 31 MA's), (35, 33178), (44, 33070), (49, 33031), (54, 32992), (56, 32977), (58, 32971), (67, 32908), (72, 32875),

Gene: AndPeggy\_41 Start: 32608, Stop: 32153, Start Num: 22

Candidate Starts for AndPeggy\_41:

(1, 32992), (3, 32857), (4, 32806), (5, 32764), (10, 32674), (14, 32653), (Start: 22 @32608 has 31 MA's), (35, 32509), (36, 32494), (39, 32458), (44, 32401), (49, 32362), (51, 32347), (54, 32323), (56, 32308), (67, 32239), (72, 32206),

Gene: Axym\_43 Start: 32972, Stop: 32448, Start Num: 22

Candidate Starts for Axym\_43:

(14, 33017), (Start: 22 @32972 has 31 MA's), (35, 32873), (39, 32822), (49, 32726), (54, 32687), (62, 32645), (72, 32570), (82, 32528),

Gene: Azira\_41 Start: 32431, Stop: 32018, Start Num: 23

Candidate Starts for Azira\_41:

(11, 32494), (Start: 23 @32431 has 7 MA's), (Start: 28 @32401 has 1 MA's), (29, 32395), (30, 32383), (44, 32227), (45, 32221), (52, 32167), (56, 32134), (58, 32128),

Gene: BillDoor\_44 Start: 32280, Stop: 31822, Start Num: 22

Candidate Starts for BillDoor\_44:

(Start: 22 @32280 has 31 MA's), (35, 32181), (36, 32166), (39, 32130), (44, 32073), (49, 32034), (51, 32019), (54, 31995), (56, 31980), (62, 31953), (72, 31878), (78, 31863), (80, 31842), (81, 31839),

Gene: Biskit\_46 Start: 32979, Stop: 32512, Start Num: 20

Candidate Starts for Biskit\_46:

(Start: 20 @32979 has 8 MA's), (35, 32871), (39, 32820), (44, 32763), (49, 32724), (51, 32709), (54, 32685), (62, 32643), (72, 32568), (77, 32556), (78, 32553), (81, 32529), (82, 32526),

Gene: Blondies\_47 Start: 33296, Stop: 32829, Start Num: 20

Candidate Starts for Blondies\_47:

(Start: 20 @33296 has 8 MA's), (35, 33188), (39, 33137), (44, 33080), (49, 33041), (51, 33026), (54, 33002), (62, 32960), (72, 32885), (77, 32873), (78, 32870), (81, 32846), (82, 32843),

Gene: Bubble\_42 Start: 32662, Stop: 32138, Start Num: 22

Candidate Starts for Bubble\_42:

(14, 32707), (Start: 22 @32662 has 31 MA's), (35, 32563), (39, 32512), (49, 32416), (54, 32377), (62, 32335), (72, 32260), (82, 32218),

Gene: Burnsey\_44 Start: 33066, Stop: 32542, Start Num: 22

Candidate Starts for Burnsey\_44:

(14, 33111), (Start: 22 @33066 has 31 MA's), (35, 32967), (39, 32916), (49, 32820), (54, 32781), (62, 32739), (72, 32664), (82, 32622),

Gene: Button\_47 Start: 33224, Stop: 32799, Start Num: 22

Candidate Starts for Button\_47:

(2, 33473), (Start: 22 @33224 has 31 MA's), (Start: 28 @33191 has 1 MA's), (35, 33125), (46, 32996), (66, 32849), (72, 32810),

Gene: Buttrmlkdreams\_46 Start: 33426, Stop: 32959, Start Num: 20

Candidate Starts for Buttrmlkdreams\_46:

(Start: 20 @33426 has 8 MA's), (35, 33318), (39, 33267), (44, 33210), (49, 33171), (51, 33156), (54, 33132), (62, 33090), (72, 33015), (77, 33003), (78, 33000), (81, 32976),

Gene: Carsonalex\_47 Start: 33034, Stop: 32510, Start Num: 22

Candidate Starts for Carsonalex\_47:

(14, 33079), (Start: 22 @33034 has 31 MA's), (35, 32935), (39, 32884), (49, 32788), (54, 32749), (62, 32707), (72, 32632), (82, 32590),

Gene: Cleo\_39 Start: 32050, Stop: 31601, Start Num: 17

Candidate Starts for Cleo\_39:

(Start: 17 @32050 has 1 MA's), (Start: 24 @32023 has 3 MA's), (Start: 28 @31993 has 1 MA's), (29, 31987), (30, 31975), (48, 31786), (51, 31765), (52, 31759), (69, 31639),

Gene: Cozz\_42 Start: 32663, Stop: 32139, Start Num: 22

Candidate Starts for Cozz\_42:

(13, 32711), (14, 32708), (Start: 22 @32663 has 31 MA's), (35, 32564), (39, 32513), (49, 32417), (54, 32378), (62, 32336), (72, 32261), (82, 32219),

Gene: Dre3\_39 Start: 31766, Stop: 31344, Start Num: 24

Candidate Starts for Dre3\_39:

(Start: 24 @31766 has 3 MA's), (Start: 28 @31736 has 1 MA's), (29, 31730), (30, 31718), (48, 31529), (51, 31508), (52, 31502), (69, 31382),

Gene: Elliott\_44 Start: 32961, Stop: 32437, Start Num: 22

Candidate Starts for Elliott\_44:

(14, 33006), (Start: 22 @32961 has 31 MA's), (35, 32862), (39, 32811), (43, 32766), (49, 32715), (54, 32676), (62, 32634), (72, 32559), (82, 32517),

Gene: Emalyn\_43 Start: 32069, Stop: 31614, Start Num: 22

Candidate Starts for Emalyn\_43:

(14, 32114), (Start: 22 @32069 has 31 MA's), (35, 31970), (44, 31862), (49, 31823), (54, 31784), (56, 31769), (58, 31763), (67, 31700), (72, 31667),

Gene: FF47\_44A Start: 34701, Stop: 34159, Start Num: 22

Candidate Starts for FF47\_44A:

(Start: 22 @34701 has 31 MA's), (26, 34674), (29, 34662), (34, 34608), (37, 34584), (39, 34551), (50, 34452), (58, 34395), (70, 34308),

Gene: Fribs8\_40 Start: 32159, Stop: 31746, Start Num: 23

Candidate Starts for Fribs8\_40:

(Start: 23 @32159 has 7 MA's), (Start: 28 @32129 has 1 MA's), (29, 32123), (30, 32111), (44, 31955), (52, 31895), (57, 31859), (63, 31832), (76, 31760),

Gene: GTE2\_36 Start: 32665, Stop: 32207, Start Num: 22

Candidate Starts for GTE2\_36:

(14, 32710), (Start: 22 @32665 has 31 MA's), (35, 32566), (36, 32551), (39, 32515), (44, 32458), (49, 32419), (54, 32380), (56, 32365), (62, 32338), (72, 32263), (78, 32248), (80, 32227), (81, 32224),

Gene: GiKK\_49 Start: 33554, Stop: 33129, Start Num: 22

Candidate Starts for GiKK\_49:

(Start: 22 @33554 has 31 MA's), (Start: 28 @33521 has 1 MA's), (35, 33455), (46, 33326), (66, 33179), (72, 33140),

Gene: Gibbous\_39 Start: 31766, Stop: 31344, Start Num: 24

Candidate Starts for Gibbous\_39:

(Start: 24 @31766 has 3 MA's), (Start: 28 @31736 has 1 MA's), (29, 31730), (30, 31718), (48, 31529), (51, 31508), (52, 31502), (69, 31382),

Gene: GoldHunter\_45 Start: 33075, Stop: 32551, Start Num: 22

Candidate Starts for GoldHunter\_45:

(13, 33123), (14, 33120), (Start: 22 @33075 has 31 MA's), (35, 32976), (39, 32925), (49, 32829), (54, 32790), (62, 32748), (72, 32673),

Gene: Hexbug\_52 Start: 35640, Stop: 35221, Start Num: 22

Candidate Starts for Hexbug\_52:

(Start: 22 @35640 has 31 MA's), (25, 35616), (Start: 28 @35607 has 1 MA's), (33, 35556), (34, 35547), (48, 35394), (52, 35367), (72, 35232),

Gene: HippoPololi\_41 Start: 32178, Stop: 31756, Start Num: 24

Candidate Starts for HippoPololi\_41:

(Start: 17 @32205 has 1 MA's), (Start: 24 @32178 has 3 MA's), (Start: 28 @32148 has 1 MA's), (29, 32142), (30, 32130), (31, 32103), (44, 31974), (45, 31968), (52, 31914), (56, 31881), (58, 31875), (67, 31812),

Gene: Horseradish\_46 Start: 32912, Stop: 32445, Start Num: 20

Candidate Starts for Horseradish\_46:

(Start: 20 @32912 has 8 MA's), (35, 32804), (39, 32753), (44, 32696), (49, 32657), (51, 32642), (54, 32618), (62, 32576), (72, 32501), (77, 32489), (78, 32486), (81, 32462), (82, 32459),

Gene: Huwbert\_70 Start: 43330, Stop: 43914, Start Num: 7

Candidate Starts for Huwbert\_70:

(Start: 7 @43330 has 2 MA's), (8, 43351), (9, 43357), (16, 43408), (29, 43474), (32, 43531), (38, 43588), (41, 43633), (52, 43765), (53, 43774), (62, 43825), (66, 43861), (67, 43867),

Gene: Jamzy\_49 Start: 33537, Stop: 33112, Start Num: 22

Candidate Starts for Jamzy\_49:

(Start: 22 @33537 has 31 MA's), (Start: 28 @33504 has 1 MA's), (35, 33438), (37, 33420), (46, 33309), (66, 33162), (72, 33123),

Gene: KimJongPhill\_79 Start: 56740, Stop: 57207, Start Num: 23

Candidate Starts for KimJongPhill\_79:

(Start: 23 @56740 has 7 MA's), (27, 56767), (Start: 28 @56770 has 1 MA's), (39, 56887), (47, 57016), (55, 57094), (58, 57103), (62, 57124), (66, 57160),

Gene: MScarn\_48 Start: 33094, Stop: 32627, Start Num: 20

Candidate Starts for MScarn\_48:

(Start: 20 @33094 has 8 MA's), (35, 32986), (39, 32935), (44, 32878), (49, 32839), (51, 32824), (54, 32800), (62, 32758), (72, 32683), (80, 32647), (81, 32644),

Gene: MaVan\_41 Start: 32460, Stop: 32047, Start Num: 23

Candidate Starts for MaVan\_41:

(11, 32523), (Start: 23 @32460 has 7 MA's), (Start: 28 @32430 has 1 MA's), (29, 32424), (30, 32412), (44, 32256), (45, 32250), (52, 32196), (56, 32163), (58, 32157),

Gene: Maco6\_43 Start: 34041, Stop: 33499, Start Num: 22

Candidate Starts for Maco6\_43:

(Start: 22 @34041 has 31 MA's), (26, 34014), (29, 34002), (34, 33948), (37, 33924), (39, 33891), (58, 33735), (59, 33729), (70, 33648),

Gene: Margaret\_50 Start: 34280, Stop: 33861, Start Num: 22

Candidate Starts for Margaret\_50:

(Start: 22 @34280 has 31 MA's), (Start: 28 @34247 has 1 MA's), (33, 34196), (34, 34187), (46, 34058), (48, 34034), (72, 33872),

Gene: Muddy\_45 Start: 35273, Stop: 34731, Start Num: 22

Candidate Starts for Muddy\_45:

(Start: 22 @35273 has 31 MA's), (26, 35246), (29, 35234), (34, 35180), (37, 35156), (39, 35123), (50, 35024), (58, 34967), (70, 34880),

Gene: MunkgeeRoachy\_42 Start: 32424, Stop: 31900, Start Num: 22

Candidate Starts for MunkgeeRoachy\_42:

(14, 32469), (Start: 22 @32424 has 31 MA's), (35, 32325), (39, 32274), (40, 32256), (43, 32229), (49, 32178), (54, 32139), (56, 32124), (62, 32097), (65, 32085), (72, 32022), (82, 31980),

Gene: Nibbles\_40 Start: 32147, Stop: 31734, Start Num: 23

Candidate Starts for Nibbles\_40:

(11, 32210), (Start: 23 @32147 has 7 MA's), (Start: 28 @32117 has 1 MA's), (29, 32111), (30, 32099), (44, 31943), (45, 31937), (52, 31883), (56, 31850), (58, 31844),

Gene: Nina\_43 Start: 33199, Stop: 32675, Start Num: 22

Candidate Starts for Nina\_43:

(14, 33244), (Start: 22 @33199 has 31 MA's), (35, 33100), (39, 33049), (49, 32953), (54, 32914), (62, 32872), (72, 32797), (82, 32755),

Gene: NoShow\_53 Start: 38273, Stop: 37752, Start Num: 22

Candidate Starts for NoShow\_53:

(6, 38381), (19, 38285), (Start: 22 @38273 has 31 MA's), (62, 37946), (64, 37937), (68, 37892), (70, 37880), (72, 37871), (75, 37865),

Gene: Nodigi\_52 Start: 35691, Stop: 35272, Start Num: 22

Candidate Starts for Nodigi\_52:

(Start: 22 @35691 has 31 MA's), (25, 35667), (Start: 28 @35658 has 1 MA's), (33, 35607), (34, 35598), (48, 35445), (52, 35418), (72, 35283),

Gene: Orla\_52 Start: 35599, Stop: 35180, Start Num: 22

Candidate Starts for Orla\_52:

(Start: 22 @35599 has 31 MA's), (25, 35575), (Start: 28 @35566 has 1 MA's), (33, 35515), (34, 35506), (48, 35353), (52, 35326), (72, 35191),

Gene: PotPie\_45 Start: 35409, Stop: 34900, Start Num: 12

Candidate Starts for PotPie\_45:

(Start: 12 @35409 has 3 MA's), (39, 35205), (49, 35109), (51, 35094), (58, 35049), (62, 35028), (72, 34953), (74, 34950), (79, 34935),

Gene: PsychoKiller\_43 Start: 32962, Stop: 32438, Start Num: 22

Candidate Starts for PsychoKiller\_43:

(14, 33007), (Start: 22 @32962 has 31 MA's), (35, 32863), (39, 32812), (43, 32767), (49, 32716), (54, 32677), (62, 32635), (72, 32560), (82, 32518),

Gene: Quasar\_44 Start: 33624, Stop: 33100, Start Num: 22

Candidate Starts for Quasar\_44:

(14, 33669), (15, 33660), (Start: 22 @33624 has 31 MA's), (35, 33525), (39, 33474), (49, 33378), (54, 33339), (62, 33297), (72, 33222), (82, 33180),

Gene: RADical\_45 Start: 32956, Stop: 32432, Start Num: 22

Candidate Starts for RADical\_45:

(14, 33001), (Start: 22 @32956 has 31 MA's), (35, 32857), (39, 32806), (49, 32710), (54, 32671), (62, 32629), (72, 32554), (82, 32512),

Gene: RSchmailzl\_45 Start: 33112, Stop: 32588, Start Num: 22

Candidate Starts for RSchmailzl\_45:

(14, 33157), (Start: 22 @33112 has 31 MA's), (35, 33013), (39, 32962), (49, 32866), (54, 32827), (62, 32785), (72, 32710),

Gene: RanchParmCat\_49 Start: 34421, Stop: 34002, Start Num: 22

Candidate Starts for RanchParmCat\_49:

(Start: 22 @34421 has 31 MA's), (Start: 28 @34388 has 1 MA's), (33, 34337), (34, 34328), (46, 34199), (48, 34175), (72, 34013),

Gene: RedBaron\_46 Start: 33291, Stop: 32767, Start Num: 22

Candidate Starts for RedBaron\_46:

(14, 33336), (Start: 22 @33291 has 31 MA's), (35, 33192), (39, 33141), (49, 33045), (54, 33006), (62, 32964), (72, 32889), (82, 32847),

Gene: Shrew\_78 Start: 46074, Stop: 46502, Start Num: 22

Candidate Starts for Shrew\_78:

(21, 46071), (Start: 22 @46074 has 31 MA's), (26, 46098), (29, 46110), (30, 46122), (60, 46407), (61, 46410), (66, 46452), (73, 46491),

Gene: SketchMex\_44 Start: 32979, Stop: 32512, Start Num: 20

Candidate Starts for SketchMex\_44:

(Start: 20 @32979 has 8 MA's), (35, 32871), (39, 32820), (44, 32763), (49, 32724), (51, 32709), (54, 32685), (62, 32643), (72, 32568), (77, 32556), (78, 32553), (81, 32529), (82, 32526),

Gene: Socotra\_45 Start: 33074, Stop: 32550, Start Num: 22

Candidate Starts for Socotra\_45:

(14, 33119), (Start: 22 @33074 has 31 MA's), (35, 32975), (39, 32924), (49, 32828), (54, 32789), (62, 32747), (72, 32672), (82, 32630),

Gene: Sopespian\_42 Start: 32963, Stop: 32439, Start Num: 22

Candidate Starts for Sopespian\_42:

(14, 33008), (Start: 22 @32963 has 31 MA's), (35, 32864), (39, 32813), (43, 32768), (49, 32717), (54, 32678), (62, 32636), (72, 32561), (82, 32519),

Gene: Starburst\_44 Start: 32956, Stop: 32432, Start Num: 22

Candidate Starts for Starburst\_44:

(14, 33001), (Start: 22 @32956 has 31 MA's), (35, 32857), (39, 32806), (43, 32761), (49, 32710), (54, 32671), (62, 32629), (72, 32554), (82, 32512),

Gene: SteamedHams\_44 Start: 32460, Stop: 32005, Start Num: 22

Candidate Starts for SteamedHams\_44:

(1, 32844), (3, 32709), (4, 32658), (5, 32616), (10, 32526), (14, 32505), (Start: 22 @32460 has 31 MA's), (35, 32361), (36, 32346), (39, 32310), (44, 32253), (49, 32214), (51, 32199), (54, 32175), (56, 32160), (67, 32091), (72, 32058),

Gene: Survivors\_41 Start: 32356, Stop: 31943, Start Num: 23

Candidate Starts for Survivors\_41:

(11, 32419), (Start: 23 @32356 has 7 MA's), (Start: 28 @32326 has 1 MA's), (29, 32320), (30, 32308), (44, 32152), (45, 32146), (52, 32092), (56, 32059), (58, 32053),

Gene: SweatNTears\_45 Start: 32906, Stop: 32448, Start Num: 22

Candidate Starts for SweatNTears\_45:

(Start: 22 @32906 has 31 MA's), (35, 32807), (39, 32756), (44, 32699), (49, 32660), (51, 32645), (54, 32621), (62, 32579), (72, 32504), (77, 32492), (78, 32489), (81, 32465), (82, 32462),

Gene: Tolls\_45 Start: 32853, Stop: 32398, Start Num: 22

Candidate Starts for Tolls\_45:

(1, 33237), (3, 33102), (4, 33051), (5, 33009), (10, 32919), (14, 32898), (Start: 22 @32853 has 31 MA's), (35, 32754), (36, 32739), (39, 32703), (44, 32646), (49, 32607), (51, 32592), (54, 32568), (56,

32553), (62, 32526), (72, 32451),

Gene: Triscuit\_69 Start: 43287, Stop: 43871, Start Num: 7

Candidate Starts for Triscuit\_69:

(Start: 7 @43287 has 2 MA's), (8, 43308), (9, 43314), (16, 43365), (29, 43431), (32, 43488), (38, 43545), (39, 43563), (41, 43590), (52, 43722), (53, 43731), (62, 43782), (66, 43818), (67, 43824),

Gene: Troje\_46 Start: 33317, Stop: 32850, Start Num: 20

Candidate Starts for Troje\_46:

(Start: 20 @33317 has 8 MA's), (35, 33209), (39, 33158), (44, 33101), (49, 33062), (51, 33047), (54, 33023), (62, 32981), (72, 32906), (77, 32894), (78, 32891), (81, 32867), (82, 32864),

Gene: Typhonomachy\_43 Start: 32785, Stop: 32261, Start Num: 22

Candidate Starts for Typhonomachy\_43:

(14, 32830), (Start: 22 @32785 has 31 MA's), (35, 32686), (39, 32635), (49, 32539), (54, 32500), (62, 32458), (72, 32383), (82, 32341),

Gene: Vine\_48 Start: 35175, Stop: 34666, Start Num: 12

Candidate Starts for Vine\_48:

(Start: 12 @35175 has 3 MA's), (42, 34941), (49, 34875), (51, 34860), (58, 34815), (62, 34794), (72, 34719), (74, 34716), (79, 34701),

Gene: Wolfwood\_43 Start: 32428, Stop: 32015, Start Num: 23

Candidate Starts for Wolfwood\_43:

(11, 32491), (Start: 23 @32428 has 7 MA's), (Start: 28 @32398 has 1 MA's), (29, 32392), (30, 32380), (44, 32224), (45, 32218), (52, 32164), (56, 32131), (58, 32125),

Gene: Yakult\_47 Start: 34354, Stop: 33935, Start Num: 22

Candidate Starts for Yakult\_47:

(Start: 22 @34354 has 31 MA's), (Start: 28 @34321 has 1 MA's), (35, 34255), (37, 34237), (46, 34132), (62, 34021), (66, 33985), (71, 33949), (72, 33946),

Gene: Yarn\_41 Start: 32613, Stop: 32158, Start Num: 22

Candidate Starts for Yarn\_41:

(1, 32997), (3, 32862), (4, 32811), (5, 32769), (10, 32679), (14, 32658), (Start: 22 @32613 has 31 MA's), (35, 32514), (36, 32499), (39, 32463), (44, 32406), (49, 32367), (51, 32352), (54, 32328), (56, 32313), (67, 32244), (72, 32211),

Gene: Yucky\_48 Start: 34967, Stop: 34458, Start Num: 12

Candidate Starts for Yucky\_48:

(Start: 12 @34967 has 3 MA's), (39, 34763), (49, 34667), (51, 34652), (58, 34607), (62, 34586), (72, 34511), (74, 34508), (79, 34493),

Gene: Yummy\_46 Start: 33026, Stop: 32559, Start Num: 20

Candidate Starts for Yummy\_46:

(Start: 20 @33026 has 8 MA's), (35, 32918), (39, 32867), (44, 32810), (49, 32771), (51, 32756), (54, 32732), (62, 32690), (72, 32615), (77, 32603), (78, 32600), (81, 32576), (82, 32573),

Gene: Zareef\_41 Start: 32450, Stop: 32037, Start Num: 23

Candidate Starts for Zareef\_41:

(11, 32513), (Start: 23 @32450 has 7 MA's), (Start: 28 @32420 has 1 MA's), (29, 32414), (30, 32402), (44, 32246), (45, 32240), (52, 32186), (56, 32153), (58, 32147),

Gene: Zuko\_77 Start: 57041, Stop: 57478, Start Num: 28

Candidate Starts for Zuko\_77:

(18, 56990), (Start: 23 @57011 has 7 MA's), (Start: 28 @57041 has 1 MA's), (33, 57092), (47, 57287),  
(55, 57365), (62, 57395),