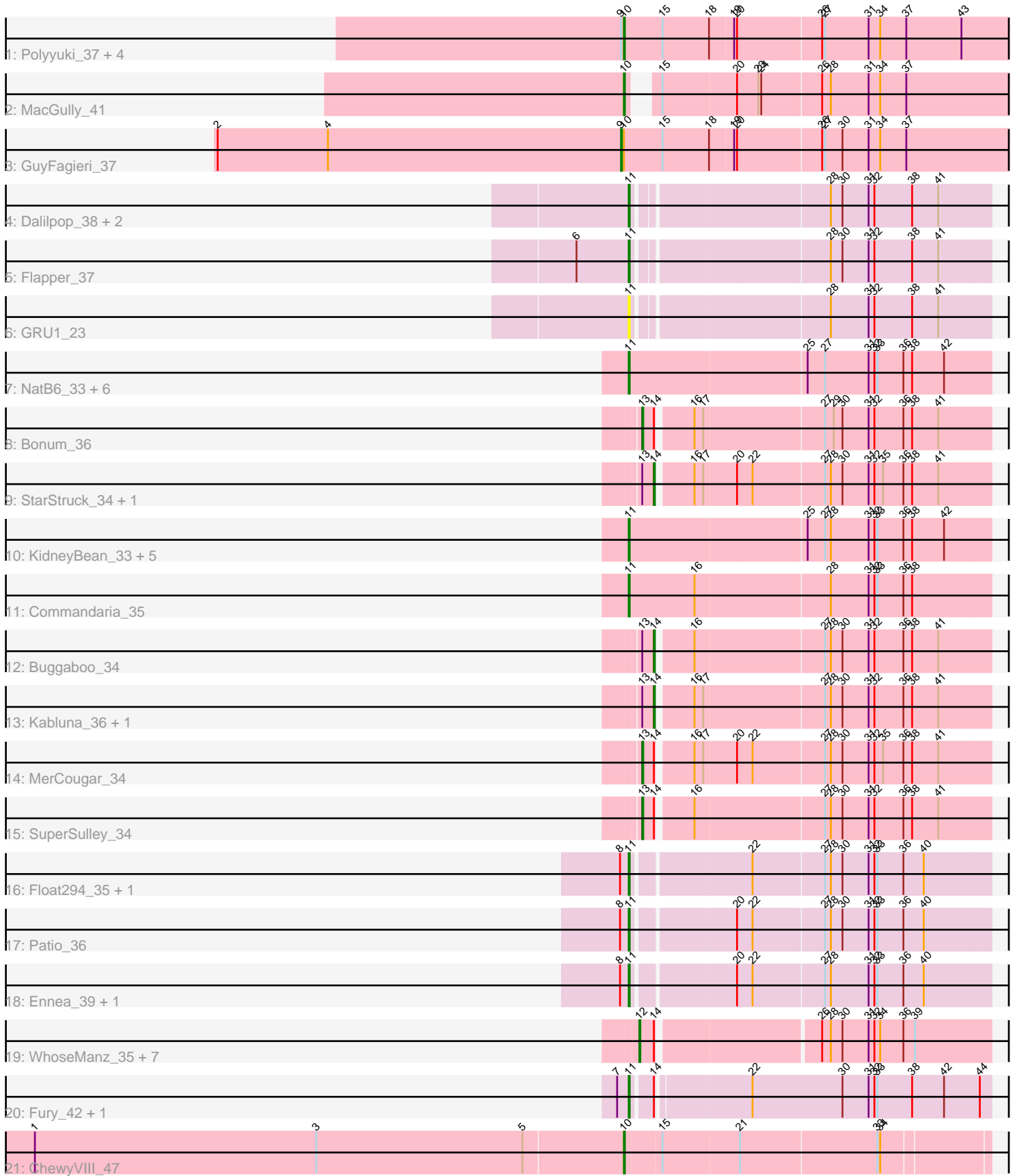


# Pham 2053



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 2053 Report

This analysis was run 07/09/24 on database version 566.

Pham number 2053 has 50 members, 5 are drafts.

Phages represented in each track:

- Track 1 : Polyuyki\_37, Maselop\_37, Apiary\_37, CoffeeBean\_37, Braxoaddie\_37
- Track 2 : MacGully\_41
- Track 3 : GuyFagieri\_37
- Track 4 : Dalilpop\_38, GTE5\_24, Turuncu\_37
- Track 5 : Flapper\_37
- Track 6 : GRU1\_23
- Track 7 : NatB6\_33, Kurt\_33, Emianna\_33, Jifall16\_32, Tracker\_33, Phomeo\_32, Foxboro\_34
- Track 8 : Bonum\_36
- Track 9 : StarStruck\_34, Outis\_34
- Track 10 : KidneyBean\_33, Wheezy\_33, NovumRegina\_33, GrootJr\_35, GTE8\_22, Arti\_33
- Track 11 : Commandaria\_35
- Track 12 : Buggaboo\_34
- Track 13 : Kabluna\_36, NosilaM\_36
- Track 14 : MerCougar\_34
- Track 15 : SuperSulley\_34
- Track 16 : Float294\_35, Skysand\_35
- Track 17 : Patio\_36
- Track 18 : Ennea\_39, Lollipop1437\_38
- Track 19 : WhoseManz\_35, HubbaBubba\_32, NadineRae\_33, BiPauneto\_36, IDyn\_34, Marietta\_35, Sukkupi\_35, Yndexa\_35
- Track 20 : Fury\_42, Pleakley\_42
- Track 21 : ChewyVIII\_47

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

The start number called the most often in the published annotations is 11, it was called in 22 of the 45 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Arti\_33, Commandaria\_35, Dalilpop\_38, Emianna\_33, Ennea\_39, Flapper\_37, Float294\_35, Foxboro\_34, Fury\_42, GRU1\_23, GTE5\_24, GTE8\_22, GrootJr\_35, Jifall16\_32, KidneyBean\_33, Kurt\_33, Lollipop1437\_38, NatB6\_33,

NovumRegina\_33, Patio\_36, Phomeo\_32, Pleakley\_42, Skysand\_35, Tracker\_33, Turuncu\_37, Wheezy\_33,

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

- 

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

- Apiary\_37, BiPauneto\_36, Bonum\_36, Braxoaddie\_37, Buggaboo\_34, ChewyVIII\_47, CoffeeBean\_37, GuyFagieri\_37, HubbaBubba\_32, IDyn\_34, Kabluna\_36, MacGully\_41, Marietta\_35, Maselop\_37, MerCougar\_34, NadineRae\_33, NosilaM\_36, Outis\_34, Polyyuki\_37, StarStruck\_34, Sukkupi\_35, SuperSulley\_34, WhoseManz\_35, Yndexa\_35,

### Summary by start number:

Start 9:

- Found in 6 of 50 ( 12.0% ) of genes in pham
- Manual Annotations of this start: 1 of 45
- Called 16.7% of time when present
- Phage (with cluster) where this start called: GuyFagieri\_37 (CR),

Start 10:

- Found in 8 of 50 ( 16.0% ) of genes in pham
- Manual Annotations of this start: 7 of 45
- Called 87.5% of time when present
- Phage (with cluster) where this start called: Apiary\_37 (CR), Braxoaddie\_37 (CR), ChewyVIII\_47 (singleton), CoffeeBean\_37 (CR), MacGully\_41 (CR), Maselop\_37 (CR), Polyyuki\_37 (CR),

Start 11:

- Found in 26 of 50 ( 52.0% ) of genes in pham
- Manual Annotations of this start: 22 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Arti\_33 (CR2), Commandaria\_35 (CR2), Dalipop\_38 (CR1), Emianna\_33 (CR2), Ennea\_39 (CR3), Flapper\_37 (CR1), Float294\_35 (CR3), Foxboro\_34 (CR2), Fury\_42 (CR5), GRU1\_23 (CR1), GTE5\_24 (CR1), GTE8\_22 (CR2), GrootJr\_35 (CR2), Jifall16\_32 (CR2), KidneyBean\_33 (CR2), Kurt\_33 (CR2), Lollipop1437\_38 (CR3), NatB6\_33 (CR2), NovumRegina\_33 (CR2), Patio\_36 (CR3), Phomeo\_32 (CR2), Pleakley\_42 (CR5), Skysand\_35 (CR3), Tracker\_33 (CR2), Turuncu\_37 (CR1), Wheezy\_33 (CR2),

Start 12:

- Found in 8 of 50 ( 16.0% ) of genes in pham
- Manual Annotations of this start: 7 of 45
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BiPauneto\_36 (CR4), HubbaBubba\_32 (CR4), IDyn\_34 (CR4), Marietta\_35 (CR4), NadineRae\_33 (CR4), Sukkupi\_35 (CR4), WhoseManz\_35 (CR4), Yndexa\_35 (CR4),

Start 13:

- Found in 8 of 50 ( 16.0% ) of genes in pham
- Manual Annotations of this start: 3 of 45
- Called 37.5% of time when present

- Phage (with cluster) where this start called: Bonum\_36 (CR2), MerCougar\_34 (CR2), SuperSulley\_34 (CR2),

Start 14:

- Found in 18 of 50 ( 36.0% ) of genes in pham
- Manual Annotations of this start: 5 of 45
- Called 27.8% of time when present
- Phage (with cluster) where this start called: Buggaboo\_34 (CR2), Kabluna\_36 (CR2), NosilaM\_36 (CR2), Outis\_34 (CR2), StarStruck\_34 (CR2),

### **Summary by clusters:**

There are 7 clusters represented in this pham: CR2, CR3, singleton, CR1, CR4, CR5, CR,

Info for manual annotations of cluster CR:

- Start number 9 was manually annotated 1 time for cluster CR.
- Start number 10 was manually annotated 6 times for cluster CR.

Info for manual annotations of cluster CR1:

- Start number 11 was manually annotated 3 times for cluster CR1.

Info for manual annotations of cluster CR2:

- Start number 11 was manually annotated 12 times for cluster CR2.
- Start number 13 was manually annotated 3 times for cluster CR2.
- Start number 14 was manually annotated 5 times for cluster CR2.

Info for manual annotations of cluster CR3:

- Start number 11 was manually annotated 5 times for cluster CR3.

Info for manual annotations of cluster CR4:

- Start number 12 was manually annotated 7 times for cluster CR4.

Info for manual annotations of cluster CR5:

- Start number 11 was manually annotated 2 times for cluster CR5.

### **Gene Information:**

Gene: Apiary\_37 Start: 22347, Stop: 22754, Start Num: 10

Candidate Starts for Apiary\_37:

(Start: 9 @22344 has 1 MA's), (Start: 10 @22347 has 7 MA's), (15, 22386), (18, 22434), (19, 22458), (20, 22461), (26, 22545), (27, 22548), (31, 22593), (34, 22605), (37, 22632), (43, 22689),

Gene: Arti\_33 Start: 20476, Stop: 20841, Start Num: 11

Candidate Starts for Arti\_33:

(Start: 11 @20476 has 22 MA's), (25, 20653), (27, 20671), (28, 20677), (31, 20716), (32, 20722), (33, 20725), (36, 20752), (38, 20761), (42, 20794),

Gene: BiPauneto\_36 Start: 20337, Stop: 20681, Start Num: 12

Candidate Starts for BiPauneto\_36:

(Start: 12 @20337 has 7 MA's), (Start: 14 @20352 has 5 MA's), (26, 20508), (28, 20517), (30, 20529), (31, 20556), (32, 20562), (34, 20568), (36, 20592), (39, 20604),

Gene: Bonum\_36 Start: 20813, Stop: 21157, Start Num: 13

Candidate Starts for Bonum\_36:

(Start: 13 @20813 has 3 MA's), (Start: 14 @20825 has 5 MA's), (16, 20858), (17, 20867), (27, 20987), (29, 20996), (30, 21005), (31, 21032), (32, 21038), (36, 21068), (38, 21077), (41, 21104),

Gene: Braxoaddie\_37 Start: 22336, Stop: 22743, Start Num: 10

Candidate Starts for Braxoaddie\_37:

(Start: 9 @22333 has 1 MA's), (Start: 10 @22336 has 7 MA's), (15, 22375), (18, 22423), (19, 22447), (20, 22450), (26, 22534), (27, 22537), (31, 22582), (34, 22594), (37, 22621), (43, 22678),

Gene: Buggaboo\_34 Start: 21310, Stop: 21642, Start Num: 14

Candidate Starts for Buggaboo\_34:

(Start: 13 @21298 has 3 MA's), (Start: 14 @21310 has 5 MA's), (16, 21343), (27, 21472), (28, 21478), (30, 21490), (31, 21517), (32, 21523), (36, 21553), (38, 21562), (41, 21589),

Gene: ChewyVIII\_47 Start: 27994, Stop: 28353, Start Num: 10

Candidate Starts for ChewyVIII\_47:

(1, 27388), (3, 27679), (5, 27892), (Start: 10 @27994 has 7 MA's), (15, 28030), (21, 28108), (33, 28246), (34, 28249),

Gene: CoffeeBean\_37 Start: 22291, Stop: 22698, Start Num: 10

Candidate Starts for CoffeeBean\_37:

(Start: 9 @22288 has 1 MA's), (Start: 10 @22291 has 7 MA's), (15, 22330), (18, 22378), (19, 22402), (20, 22405), (26, 22489), (27, 22492), (31, 22537), (34, 22549), (37, 22576), (43, 22633),

Gene: Commandaria\_35 Start: 21797, Stop: 22162, Start Num: 11

Candidate Starts for Commandaria\_35:

(Start: 11 @21797 has 22 MA's), (16, 21863), (28, 21998), (31, 22037), (32, 22043), (33, 22046), (36, 22073), (38, 22082),

Gene: Dalilpop\_38 Start: 22800, Stop: 23150, Start Num: 11

Candidate Starts for Dalilpop\_38:

(Start: 11 @22800 has 22 MA's), (28, 22986), (30, 22998), (31, 23025), (32, 23031), (38, 23070), (41, 23097),

Gene: Emianna\_33 Start: 21513, Stop: 21878, Start Num: 11

Candidate Starts for Emianna\_33:

(Start: 11 @21513 has 22 MA's), (25, 21690), (27, 21708), (31, 21753), (32, 21759), (33, 21762), (36, 21789), (38, 21798), (42, 21831),

Gene: Ennea\_39 Start: 22127, Stop: 22480, Start Num: 11

Candidate Starts for Ennea\_39:

(8, 22118), (Start: 11 @22127 has 22 MA's), (20, 22223), (22, 22238), (27, 22310), (28, 22316), (31, 22355), (32, 22361), (33, 22364), (36, 22391), (40, 22412),

Gene: Flapper\_37 Start: 21882, Stop: 22232, Start Num: 11

Candidate Starts for Flapper\_37:

(6, 21828), (Start: 11 @21882 has 22 MA's), (28, 22068), (30, 22080), (31, 22107), (32, 22113), (38, 22152), (41, 22179),

Gene: Float294\_35 Start: 21566, Stop: 21919, Start Num: 11

Candidate Starts for Float294\_35:

(8, 21557), (Start: 11 @21566 has 22 MA's), (22, 21677), (27, 21749), (28, 21755), (30, 21767), (31, 21794), (32, 21800), (33, 21803), (36, 21830), (40, 21851),

Gene: Foxboro\_34 Start: 22019, Stop: 22384, Start Num: 11

Candidate Starts for Foxboro\_34:

(Start: 11 @22019 has 22 MA's), (25, 22196), (27, 22214), (31, 22259), (32, 22265), (33, 22268), (36, 22295), (38, 22304), (42, 22337),

Gene: Fury\_42 Start: 21176, Stop: 21529, Start Num: 11

Candidate Starts for Fury\_42:

(7, 21164), (Start: 11 @21176 has 22 MA's), (Start: 14 @21194 has 5 MA's), (22, 21284), (30, 21377), (31, 21404), (32, 21410), (33, 21413), (38, 21449), (42, 21482), (44, 21518),

Gene: GRU1\_23 Start: 13767, Stop: 14117, Start Num: 11

Candidate Starts for GRU1\_23:

(Start: 11 @13767 has 22 MA's), (28, 13953), (31, 13992), (32, 13998), (38, 14037), (41, 14064),

Gene: GTE5\_24 Start: 14770, Stop: 15120, Start Num: 11

Candidate Starts for GTE5\_24:

(Start: 11 @14770 has 22 MA's), (28, 14956), (30, 14968), (31, 14995), (32, 15001), (38, 15040), (41, 15067),

Gene: GTE8\_22 Start: 14772, Stop: 15137, Start Num: 11

Candidate Starts for GTE8\_22:

(Start: 11 @14772 has 22 MA's), (25, 14949), (27, 14967), (28, 14973), (31, 15012), (32, 15018), (33, 15021), (36, 15048), (38, 15057), (42, 15090),

Gene: GrootJr\_35 Start: 20871, Stop: 21236, Start Num: 11

Candidate Starts for GrootJr\_35:

(Start: 11 @20871 has 22 MA's), (25, 21048), (27, 21066), (28, 21072), (31, 21111), (32, 21117), (33, 21120), (36, 21147), (38, 21156), (42, 21189),

Gene: GuyFagieri\_37 Start: 22169, Stop: 22579, Start Num: 9

Candidate Starts for GuyFagieri\_37:

(2, 21752), (4, 21866), (Start: 9 @22169 has 1 MA's), (Start: 10 @22172 has 7 MA's), (15, 22211), (18, 22259), (19, 22283), (20, 22286), (26, 22370), (27, 22373), (30, 22391), (31, 22418), (34, 22430), (37, 22457),

Gene: HubbaBubba\_32 Start: 17355, Stop: 17699, Start Num: 12

Candidate Starts for HubbaBubba\_32:

(Start: 12 @17355 has 7 MA's), (Start: 14 @17370 has 5 MA's), (26, 17526), (28, 17535), (30, 17547), (31, 17574), (32, 17580), (34, 17586), (36, 17610), (39, 17622),

Gene: IDyn\_34 Start: 18751, Stop: 19095, Start Num: 12

Candidate Starts for IDyn\_34:

(Start: 12 @18751 has 7 MA's), (Start: 14 @18766 has 5 MA's), (26, 18922), (28, 18931), (30, 18943), (31, 18970), (32, 18976), (34, 18982), (36, 19006), (39, 19018),

Gene: Jifall16\_32 Start: 21140, Stop: 21505, Start Num: 11

Candidate Starts for Jifall16\_32:

(Start: 11 @21140 has 22 MA's), (25, 21317), (27, 21335), (31, 21380), (32, 21386), (33, 21389), (36, 21416), (38, 21425), (42, 21458),

Gene: Kabluna\_36 Start: 20225, Stop: 20557, Start Num: 14

Candidate Starts for Kabluna\_36:

(Start: 13 @20213 has 3 MA's), (Start: 14 @20225 has 5 MA's), (16, 20258), (17, 20267), (27, 20387), (28, 20393), (30, 20405), (31, 20432), (32, 20438), (36, 20468), (38, 20477), (41, 20504),

Gene: KidneyBean\_33 Start: 21288, Stop: 21653, Start Num: 11

Candidate Starts for KidneyBean\_33:

(Start: 11 @21288 has 22 MA's), (25, 21465), (27, 21483), (28, 21489), (31, 21528), (32, 21534), (33, 21537), (36, 21564), (38, 21573), (42, 21606),

Gene: Kurt\_33 Start: 21528, Stop: 21893, Start Num: 11

Candidate Starts for Kurt\_33:

(Start: 11 @21528 has 22 MA's), (25, 21705), (27, 21723), (31, 21768), (32, 21774), (33, 21777), (36, 21804), (38, 21813), (42, 21846),

Gene: Lollipop1437\_38 Start: 22115, Stop: 22468, Start Num: 11

Candidate Starts for Lollipop1437\_38:

(8, 22106), (Start: 11 @22115 has 22 MA's), (20, 22211), (22, 22226), (27, 22298), (28, 22304), (31, 22343), (32, 22349), (33, 22352), (36, 22379), (40, 22400),

Gene: MacGully\_41 Start: 22355, Stop: 22738, Start Num: 10

Candidate Starts for MacGully\_41:

(Start: 10 @22355 has 7 MA's), (15, 22370), (20, 22445), (23, 22466), (24, 22469), (26, 22529), (28, 22538), (31, 22577), (34, 22589), (37, 22616),

Gene: Marietta\_35 Start: 18668, Stop: 19012, Start Num: 12

Candidate Starts for Marietta\_35:

(Start: 12 @18668 has 7 MA's), (Start: 14 @18683 has 5 MA's), (26, 18839), (28, 18848), (30, 18860), (31, 18887), (32, 18893), (34, 18899), (36, 18923), (39, 18935),

Gene: Maselop\_37 Start: 22367, Stop: 22774, Start Num: 10

Candidate Starts for Maselop\_37:

(Start: 9 @22364 has 1 MA's), (Start: 10 @22367 has 7 MA's), (15, 22406), (18, 22454), (19, 22478), (20, 22481), (26, 22565), (27, 22568), (31, 22613), (34, 22625), (37, 22652), (43, 22709),

Gene: MerCougar\_34 Start: 21420, Stop: 21764, Start Num: 13

Candidate Starts for MerCougar\_34:

(Start: 13 @21420 has 3 MA's), (Start: 14 @21432 has 5 MA's), (16, 21465), (17, 21474), (20, 21507), (22, 21522), (27, 21594), (28, 21600), (30, 21612), (31, 21639), (32, 21645), (35, 21654), (36, 21675), (38, 21684), (41, 21711),

Gene: NadineRae\_33 Start: 17914, Stop: 18258, Start Num: 12

Candidate Starts for NadineRae\_33:

(Start: 12 @17914 has 7 MA's), (Start: 14 @17929 has 5 MA's), (26, 18085), (28, 18094), (30, 18106), (31, 18133), (32, 18139), (34, 18145), (36, 18169), (39, 18181),

Gene: NatB6\_33 Start: 20537, Stop: 20902, Start Num: 11

Candidate Starts for NatB6\_33:

(Start: 11 @20537 has 22 MA's), (25, 20714), (27, 20732), (31, 20777), (32, 20783), (33, 20786), (36, 20813), (38, 20822), (42, 20855),

Gene: NosilaM\_36 Start: 21122, Stop: 21454, Start Num: 14

Candidate Starts for NosilaM\_36:

(Start: 13 @21110 has 3 MA's), (Start: 14 @21122 has 5 MA's), (16, 21155), (17, 21164), (27, 21284), (28, 21290), (30, 21302), (31, 21329), (32, 21335), (36, 21365), (38, 21374), (41, 21401),

Gene: NovumRegina\_33 Start: 20870, Stop: 21235, Start Num: 11

Candidate Starts for NovumRegina\_33:

(Start: 11 @20870 has 22 MA's), (25, 21047), (27, 21065), (28, 21071), (31, 21110), (32, 21116), (33, 21119), (36, 21146), (38, 21155), (42, 21188),

Gene: Outis\_34 Start: 21126, Stop: 21458, Start Num: 14

Candidate Starts for Outis\_34:

(Start: 13 @21114 has 3 MA's), (Start: 14 @21126 has 5 MA's), (16, 21159), (17, 21168), (20, 21201), (22, 21216), (27, 21288), (28, 21294), (30, 21306), (31, 21333), (32, 21339), (35, 21348), (36, 21369), (38, 21378), (41, 21405),

Gene: Patio\_36 Start: 21351, Stop: 21704, Start Num: 11

Candidate Starts for Patio\_36:

(8, 21342), (Start: 11 @21351 has 22 MA's), (20, 21447), (22, 21462), (27, 21534), (28, 21540), (30, 21552), (31, 21579), (32, 21585), (33, 21588), (36, 21615), (40, 21636),

Gene: Phomeo\_32 Start: 21163, Stop: 21528, Start Num: 11

Candidate Starts for Phomeo\_32:

(Start: 11 @21163 has 22 MA's), (25, 21340), (27, 21358), (31, 21403), (32, 21409), (33, 21412), (36, 21439), (38, 21448), (42, 21481),

Gene: Pleakley\_42 Start: 21177, Stop: 21530, Start Num: 11

Candidate Starts for Pleakley\_42:

(7, 21165), (Start: 11 @21177 has 22 MA's), (Start: 14 @21195 has 5 MA's), (22, 21285), (30, 21378), (31, 21405), (32, 21411), (33, 21414), (38, 21450), (42, 21483), (44, 21519),

Gene: Polyzuki\_37 Start: 22359, Stop: 22766, Start Num: 10

Candidate Starts for Polyzuki\_37:

(Start: 9 @22356 has 1 MA's), (Start: 10 @22359 has 7 MA's), (15, 22398), (18, 22446), (19, 22470), (20, 22473), (26, 22557), (27, 22560), (31, 22605), (34, 22617), (37, 22644), (43, 22701),

Gene: Skysand\_35 Start: 21568, Stop: 21921, Start Num: 11

Candidate Starts for Skysand\_35:

(8, 21559), (Start: 11 @21568 has 22 MA's), (22, 21679), (27, 21751), (28, 21757), (30, 21769), (31, 21796), (32, 21802), (33, 21805), (36, 21832), (40, 21853),

Gene: StarStruck\_34 Start: 21126, Stop: 21458, Start Num: 14

Candidate Starts for StarStruck\_34:

(Start: 13 @21114 has 3 MA's), (Start: 14 @21126 has 5 MA's), (16, 21159), (17, 21168), (20, 21201), (22, 21216), (27, 21288), (28, 21294), (30, 21306), (31, 21333), (32, 21339), (35, 21348), (36, 21369), (38, 21378), (41, 21405),

Gene: Sukkupi\_35 Start: 20228, Stop: 20572, Start Num: 12

Candidate Starts for Sukkupi\_35:

(Start: 12 @20228 has 7 MA's), (Start: 14 @20243 has 5 MA's), (26, 20399), (28, 20408), (30, 20420), (31, 20447), (32, 20453), (34, 20459), (36, 20483), (39, 20495),



Gene: SuperSulley\_34 Start: 21298, Stop: 21642, Start Num: 13

Candidate Starts for SuperSulley\_34:

(Start: 13 @21298 has 3 MA's), (Start: 14 @21310 has 5 MA's), (16, 21343), (27, 21472), (28, 21478), (30, 21490), (31, 21517), (32, 21523), (36, 21553), (38, 21562), (41, 21589),

Gene: Tracker\_33 Start: 20291, Stop: 20656, Start Num: 11

Candidate Starts for Tracker\_33:

(Start: 11 @20291 has 22 MA's), (25, 20468), (27, 20486), (31, 20531), (32, 20537), (33, 20540), (36, 20567), (38, 20576), (42, 20609),

Gene: Turuncu\_37 Start: 21575, Stop: 21925, Start Num: 11

Candidate Starts for Turuncu\_37:

(Start: 11 @21575 has 22 MA's), (28, 21761), (30, 21773), (31, 21800), (32, 21806), (38, 21845), (41, 21872),

Gene: Wheezy\_33 Start: 20496, Stop: 20861, Start Num: 11

Candidate Starts for Wheezy\_33:

(Start: 11 @20496 has 22 MA's), (25, 20673), (27, 20691), (28, 20697), (31, 20736), (32, 20742), (33, 20745), (36, 20772), (38, 20781), (42, 20814),

Gene: WhoseManz\_35 Start: 18280, Stop: 18624, Start Num: 12

Candidate Starts for WhoseManz\_35:

(Start: 12 @18280 has 7 MA's), (Start: 14 @18295 has 5 MA's), (26, 18451), (28, 18460), (30, 18472), (31, 18499), (32, 18505), (34, 18511), (36, 18535), (39, 18547),

Gene: Yndexa\_35 Start: 20228, Stop: 20572, Start Num: 12

Candidate Starts for Yndexa\_35:

(Start: 12 @20228 has 7 MA's), (Start: 14 @20243 has 5 MA's), (26, 20399), (28, 20408), (30, 20420), (31, 20447), (32, 20453), (34, 20459), (36, 20483), (39, 20495),