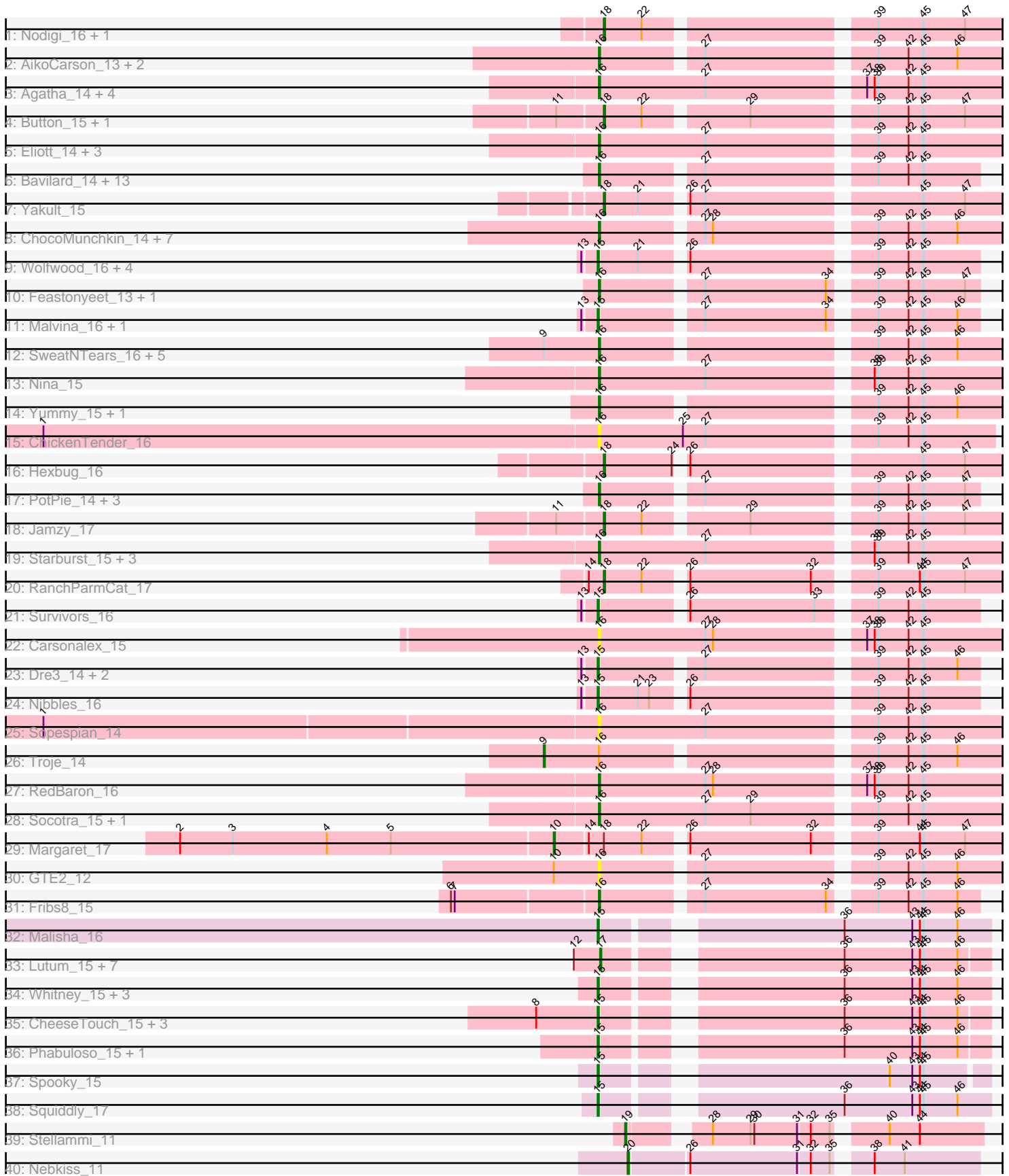


Pham 301237



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 301237 Report

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

Pham number 301237 has 106 members, 23 are drafts.

Phages represented in each track:

- Track 1 : Nodigi\_16, Orla\_16
- Track 2 : AikoCarson\_13, Amok\_13, Emalyn\_13
- Track 3 : Agatha\_14, Cozz\_14, GoldHunter\_15, RSchmailzl\_15, Axym\_14
- Track 4 : Button\_15, GiKK\_17
- Track 5 : Elliott\_14, Quasar\_15, Bubble\_14, PsychoKiller\_14
- Track 6 : Bavidard\_14, McDazzle\_13, Mayweather\_15, CocoaPuff\_13, ElJefes\_13, Vine\_15, CherryonLim\_15, SheckWes\_13, Tarnish\_14, KayGee\_14, MAnor\_14, Elinal\_15, Pons\_14, Yucky\_14
- Track 7 : Yakult\_15
- Track 8 : ChocoMunchkin\_14, SteamedHams\_16, Tolls\_16, BillDoor\_16, Yarn\_13, CanesSauce\_14, AndPeggy\_13, CaramelLatte\_14
- Track 9 : Wolfwood\_16, Zareef\_16, Wallaby\_18, MaVan\_16, Azira\_16
- Track 10 : Feastonyeet\_13, BigChungus\_13
- Track 11 : Malvina\_16, HippoPololi\_16
- Track 12 : SweatNTears\_16, Blondies\_15, Biskit\_15, Buttrmlkdreams\_14, SketchMex\_13, MScarn\_16
- Track 13 : Nina\_15
- Track 14 : Yummy\_15, Horseradish\_15
- Track 15 : ChickenTender\_16
- Track 16 : Hexbug\_16
- Track 17 : PotPie\_14, Balloona\_13, SummitAcademy\_13, Lauer\_13
- Track 18 : Jamzy\_17
- Track 19 : Starburst\_15, MunkgeeRoachy\_14, Typhonmarchy\_14, RADical\_15
- Track 20 : RanchParmCat\_17
- Track 21 : Survivors\_16
- Track 22 : Carsonalex\_15
- Track 23 : Dre3\_14, Cleo\_14, Gibbous\_14
- Track 24 : Nibbles\_16
- Track 25 : Sopespian\_14
- Track 26 : Troje\_14
- Track 27 : RedBaron\_16
- Track 28 : Socotra\_15, Burnsey\_14
- Track 29 : Margaret\_17
- Track 30 : GTE2\_12
- Track 31 : Fribs8\_15
- Track 32 : Malisha\_16

- Track 33 : Lutum\_15, BotCity\_15, Leroy\_15, Horus\_15, ShawBrad\_15, Frickyeah\_15, Asapag\_15, BENtherdunthat\_15
- Track 34 : Whitney\_15, Periwinkle\_15, Getalong\_15, Phistory\_15
- Track 35 : CheeseTouch\_15, Budski\_15, Kamaru\_15, Holliday\_16
- Track 36 : Phabuloso\_15, LitninMcQueen\_15
- Track 37 : Spooky\_15
- Track 38 : Squiddly\_17
- Track 39 : Stellammi\_11
- Track 40 : Nebkiss\_11

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

The start number called the most often in the published annotations is 16, it was called in 42 of the 83 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Agatha\_14, AikoCarson\_13, Amok\_13, AndPeggy\_13, Axym\_14, Balloona\_13, Bavidard\_14, BigChungus\_13, BillDoor\_16, Biskit\_15, Blondies\_15, Bubble\_14, Burnsey\_14, Buttrmlkdreams\_14, CanesSauce\_14, CaramellLatte\_14, Carsonalex\_15, CherryonLim\_15, ChickenTender\_16, ChocoMunchkin\_14, CocoaPuff\_13, Cozz\_14, ElJefes\_13, Elinal\_15, Elliott\_14, Emalyn\_13, Feastonyeet\_13, Fribs8\_15, GTE2\_12, GoldHunter\_15, Horseradish\_15, KayGee\_14, Lauer\_13, MAnor\_14, MScarn\_16, Mayweather\_15, McDazzle\_13, MunkgeeRoachy\_14, Nina\_15, Pons\_14, PotPie\_14, PsychoKiller\_14, Quasar\_15, RADical\_15, RSchmailzl\_15, RedBaron\_16, SheckWes\_13, SketchMex\_13, Socotra\_15, Sopespian\_14, Starburst\_15, SteamedHams\_16, SummitAcademy\_13, SweatNTears\_16, Tarnish\_14, Tolls\_16, Typhonomachy\_14, Vine\_15, Yarn\_13, Yucky\_14, Yummy\_15,

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

- Troje\_14,

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

- Asapag\_15, Azira\_16, BENtherdunthat\_15, BotCity\_15, Budski\_15, Button\_15, CheeseTouch\_15, Cleo\_14, Dre3\_14, Frickyeah\_15, Getalong\_15, GiKK\_17, Gibbous\_14, Hexbug\_16, HippoPololi\_16, Holliday\_16, Horus\_15, Jamzy\_17, Kamaru\_15, Leroy\_15, LitninMcQueen\_15, Lutum\_15, MaVan\_16, Malisha\_16, Malvina\_16, Margaret\_17, Nebkiss\_11, Nibbles\_16, Nodigi\_16, Orla\_16, Periwinkle\_15, Phabuloso\_15, Phistory\_15, RanchParmCat\_17, ShawBrad\_15, Spooky\_15, Squiddly\_17, Stellammi\_11, Survivors\_16, Wallaby\_18, Whitney\_15, Wolfwood\_16, Yakult\_15, Zareef\_16,

**Summary by start number:**

Start 9:

- Found in 7 of 106 ( 6.6% ) of genes in pham
- Manual Annotations of this start: 1 of 83
- Called 14.3% of time when present
- Phage (with cluster) where this start called: Troje\_14 (CT),

Start 10:

- Found in 2 of 106 ( 1.9% ) of genes in pham
- Manual Annotations of this start: 1 of 83
- Called 50.0% of time when present
- Phage (with cluster) where this start called: Margaret\_17 (CT),

Start 15:

- Found in 25 of 106 ( 23.6% ) of genes in pham
- Manual Annotations of this start: 23 of 83
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Azira\_16 (CT), Budski\_15 (DN), CheeseTouch\_15 (DN1), Cleo\_14 (CT), Dre3\_14 (CT), Getalong\_15 (DN1), Gibbous\_14 (CT), HippoPololi\_16 (CT), Holliday\_16 (DN1), Kamaru\_15 (DN1), LitninMcQueen\_15 (DN1), MaVan\_16 (CT), Malisha\_16 (DN), Malvina\_16 (CT), Nibbles\_16 (CT), Periwinkle\_15 (DN1), Phabuloso\_15 (DN1), Phistory\_15 (DN1), Spooky\_15 (DN2), Squiddly\_17 (DN2), Survivors\_16 (CT), Wallaby\_18 (CT), Whitney\_15 (DN1), Wolfwood\_16 (CT), Zareef\_16 (CT),

Start 16:

- Found in 62 of 106 ( 58.5% ) of genes in pham
- Manual Annotations of this start: 42 of 83
- Called 98.4% of time when present
- Phage (with cluster) where this start called: Agatha\_14 (CT), AikoCarson\_13 (CT), Amok\_13 (CT), AndPeggy\_13 (CT), Axym\_14 (CT), Balloona\_13 (CT), Bavidard\_14 (CT), BigChungus\_13 (CT), BillDoor\_16 (CT), Biskit\_15 (CT), Blondies\_15 (CT), Bubble\_14 (CT), Burnsey\_14 (CT), Buttrmlkdreams\_14 (CT), CanesSauce\_14 (CT), CaramelLatte\_14 (CT), Carsonalex\_15 (CT), CherryonLim\_15 (CT), ChickenTender\_16 (CT), ChocoMunchkin\_14 (CT), CocoaPuff\_13 (CT), Cozz\_14 (CT), ElJefes\_13 (CT), Elinal\_15 (CT), Elliott\_14 (CT), Emalyn\_13 (CT), Feastonyeet\_13 (CT), Fribs8\_15 (CT), GTE2\_12 (CT), GoldHunter\_15 (CT), Horseradish\_15 (CT), KayGee\_14 (CT), Lauer\_13 (CT), MAnor\_14 (CT), MScarn\_16 (CT), Mayweather\_15 (CT), McDazzle\_13 (CT), MunkgeeRoachy\_14 (CT), Nina\_15 (CT), Pons\_14 (CT), PotPie\_14 (CT), PsychoKiller\_14 (CT), Quasar\_15 (CT), RADical\_15 (CT), RSchmailzl\_15 (CT), RedBaron\_16 (CT), SheckWes\_13 (CT), SketchMex\_13 (CT), Socotra\_15 (CT), Sopespian\_14 (CT), Starburst\_15 (CT), SteamedHams\_16 (CT), SummitAcademy\_13 (CT), SweatNTears\_16 (CT), Tarnish\_14 (CT), Tolls\_16 (CT), Typhonmarchy\_14 (CT), Vine\_15 (CT), Yarn\_13 (CT), Yucky\_14 (CT), Yummy\_15 (CT),

Start 17:

- Found in 8 of 106 ( 7.5% ) of genes in pham
- Manual Annotations of this start: 6 of 83
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Asapag\_15 (DN1), BENtherdunthat\_15 (DN1), BotCity\_15 (DN), Frickyeah\_15 (DN1), Horus\_15 (DN1), Leroy\_15 (DN1), Lutum\_15 (DN1), ShawBrad\_15 (DN1),

Start 18:

- Found in 9 of 106 ( 8.5% ) of genes in pham
- Manual Annotations of this start: 8 of 83
- Called 88.9% of time when present
- Phage (with cluster) where this start called: Button\_15 (CT), GiKK\_17 (CT), Hexbug\_16 (CT), Jamzy\_17 (CT), Nodigi\_16 (CT), Orla\_16 (CT), RanchParmCat\_17

(CT), Yakult\_15 (CT),

Start 19:

- Found in 1 of 106 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 83
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Stellammi\_11 (UNK),

Start 20:

- Found in 1 of 106 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 83
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Nebkiss\_11 (X),

### **Summary by clusters:**

There are 6 clusters represented in this pham: DN, DN1, DN2, X, UNK, CT,

Info for manual annotations of cluster CT:

- Start number 9 was manually annotated 1 time for cluster CT.
- Start number 10 was manually annotated 1 time for cluster CT.
- Start number 15 was manually annotated 10 times for cluster CT.
- Start number 16 was manually annotated 42 times for cluster CT.
- Start number 18 was manually annotated 8 times for cluster CT.

Info for manual annotations of cluster DN:

- Start number 15 was manually annotated 2 times for cluster DN.
- Start number 17 was manually annotated 1 time for cluster DN.

Info for manual annotations of cluster DN1:

- Start number 15 was manually annotated 9 times for cluster DN1.
- Start number 17 was manually annotated 5 times for cluster DN1.

Info for manual annotations of cluster DN2:

- Start number 15 was manually annotated 2 times for cluster DN2.

Info for manual annotations of cluster UNK:

- Start number 19 was manually annotated 1 time for cluster UNK.

Info for manual annotations of cluster X:

- Start number 20 was manually annotated 1 time for cluster X.

### **Gene Information:**

Gene: Agatha\_14 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Agatha\_14:

(Start: 16 @8885 has 42 MA's), (27, 8969), (37, 9083), (38, 9089), (39, 9092), (42, 9116), (45, 9128),

Gene: AikoCarson\_13 Start: 8613, Stop: 8906, Start Num: 16

Candidate Starts for AikoCarson\_13:

(Start: 16 @8613 has 42 MA's), (27, 8685), (39, 8808), (42, 8832), (45, 8844), (46, 8871),

Gene: Amok\_13 Start: 8613, Stop: 8906, Start Num: 16

Candidate Starts for Amok\_13:

(Start: 16 @8613 has 42 MA's), (27, 8685), (39, 8808), (42, 8832), (45, 8844), (46, 8871),

Gene: AndPeggy\_13 Start: 8901, Stop: 9194, Start Num: 16

Candidate Starts for AndPeggy\_13:

(Start: 16 @8901 has 42 MA's), (27, 8973), (28, 8979), (39, 9096), (42, 9120), (45, 9132), (46, 9159),

Gene: Asapag\_15 Start: 8335, Stop: 8613, Start Num: 17

Candidate Starts for Asapag\_15:

(12, 8314), (Start: 17 @8335 has 6 MA's), (36, 8500), (43, 8554), (44, 8560), (45, 8563), (46, 8590),

Gene: Axym\_14 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Axym\_14:

(Start: 16 @8885 has 42 MA's), (27, 8969), (37, 9083), (38, 9089), (39, 9092), (42, 9116), (45, 9128),

Gene: Azira\_16 Start: 9884, Stop: 10159, Start Num: 15

Candidate Starts for Azira\_16:

(13, 9875), (Start: 15 @9884 has 23 MA's), (21, 9914), (26, 9944), (39, 10079), (42, 10103), (45, 10115),

Gene: BENtherdunthat\_15 Start: 8335, Stop: 8613, Start Num: 17

Candidate Starts for BENtherdunthat\_15:

(12, 8314), (Start: 17 @8335 has 6 MA's), (36, 8500), (43, 8554), (44, 8560), (45, 8563), (46, 8590),

Gene: Balloona\_13 Start: 8637, Stop: 8912, Start Num: 16

Candidate Starts for Balloona\_13:

(Start: 16 @8637 has 42 MA's), (27, 8709), (39, 8832), (42, 8856), (45, 8868), (47, 8901),

Gene: Bavilard\_14 Start: 9417, Stop: 9692, Start Num: 16

Candidate Starts for Bavilard\_14:

(Start: 16 @9417 has 42 MA's), (27, 9489), (39, 9612), (42, 9636), (45, 9648),

Gene: BigChungus\_13 Start: 8662, Stop: 8937, Start Num: 16

Candidate Starts for BigChungus\_13:

(Start: 16 @8662 has 42 MA's), (27, 8734), (34, 8830), (39, 8857), (42, 8881), (45, 8893), (47, 8926),

Gene: BillDoor\_16 Start: 8866, Stop: 9159, Start Num: 16

Candidate Starts for BillDoor\_16:

(Start: 16 @8866 has 42 MA's), (27, 8938), (28, 8944), (39, 9061), (42, 9085), (45, 9097), (46, 9124),

Gene: Biskit\_15 Start: 8872, Stop: 9165, Start Num: 16

Candidate Starts for Biskit\_15:

(Start: 9 @8830 has 1 MA's), (Start: 16 @8872 has 42 MA's), (39, 9067), (42, 9091), (45, 9103), (46, 9130),

Gene: Blondies\_15 Start: 8858, Stop: 9151, Start Num: 16

Candidate Starts for Blondies\_15:

(Start: 9 @8816 has 1 MA's), (Start: 16 @8858 has 42 MA's), (39, 9053), (42, 9077), (45, 9089), (46, 9116),

Gene: BotCity\_15 Start: 8333, Stop: 8611, Start Num: 17

Candidate Starts for BotCity\_15:

(12, 8312), (Start: 17 @8333 has 6 MA's), (36, 8498), (43, 8552), (44, 8558), (45, 8561), (46, 8588),

Gene: Bubble\_14 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Bubble\_14:

(Start: 16 @8885 has 42 MA's), (27, 8969), (39, 9092), (42, 9116), (45, 9128),

Gene: Budski\_15 Start: 8319, Stop: 8597, Start Num: 15

Candidate Starts for Budski\_15:

(8, 8271), (Start: 15 @8319 has 23 MA's), (36, 8484), (43, 8538), (44, 8544), (45, 8547), (46, 8574),

Gene: Burnsey\_14 Start: 8886, Stop: 9191, Start Num: 16

Candidate Starts for Burnsey\_14:

(Start: 16 @8886 has 42 MA's), (27, 8970), (29, 9006), (39, 9093), (42, 9117), (45, 9129),

Gene: Button\_15 Start: 8897, Stop: 9190, Start Num: 18

Candidate Starts for Button\_15:

(11, 8864), (Start: 18 @8897 has 8 MA's), (22, 8927), (29, 9002), (39, 9089), (42, 9113), (45, 9125), (47, 9158),

Gene: Buttrmlkdreams\_14 Start: 8857, Stop: 9150, Start Num: 16

Candidate Starts for Buttrmlkdreams\_14:

(Start: 9 @8815 has 1 MA's), (Start: 16 @8857 has 42 MA's), (39, 9052), (42, 9076), (45, 9088), (46, 9115),

Gene: CanesSauce\_14 Start: 8902, Stop: 9195, Start Num: 16

Candidate Starts for CanesSauce\_14:

(Start: 16 @8902 has 42 MA's), (27, 8974), (28, 8980), (39, 9097), (42, 9121), (45, 9133), (46, 9160),

Gene: CaramellLatte\_14 Start: 8902, Stop: 9195, Start Num: 16

Candidate Starts for CaramellLatte\_14:

(Start: 16 @8902 has 42 MA's), (27, 8974), (28, 8980), (39, 9097), (42, 9121), (45, 9133), (46, 9160),

Gene: Carsonalex\_15 Start: 8943, Stop: 9248, Start Num: 16

Candidate Starts for Carsonalex\_15:

(Start: 16 @8943 has 42 MA's), (27, 9027), (28, 9033), (37, 9141), (38, 9147), (39, 9150), (42, 9174), (45, 9186),

Gene: CheeseTouch\_15 Start: 8319, Stop: 8597, Start Num: 15

Candidate Starts for CheeseTouch\_15:

(8, 8271), (Start: 15 @8319 has 23 MA's), (36, 8484), (43, 8538), (44, 8544), (45, 8547), (46, 8574),

Gene: CherryonLim\_15 Start: 9392, Stop: 9667, Start Num: 16

Candidate Starts for CherryonLim\_15:

(Start: 16 @9392 has 42 MA's), (27, 9464), (39, 9587), (42, 9611), (45, 9623),

Gene: ChickenTender\_16 Start: 8935, Stop: 9234, Start Num: 16

Candidate Starts for ChickenTender\_16:

(1, 8494), (Start: 16 @8935 has 42 MA's), (25, 9001), (27, 9019), (39, 9142), (42, 9166), (45, 9178),

Gene: ChocoMunchkin\_14 Start: 8902, Stop: 9195, Start Num: 16

Candidate Starts for ChocoMunchkin\_14:

(Start: 16 @8902 has 42 MA's), (27, 8974), (28, 8980), (39, 9097), (42, 9121), (45, 9133), (46, 9160),

Gene: Cleo\_14 Start: 9174, Stop: 9449, Start Num: 15  
Candidate Starts for Cleo\_14:  
(13, 9165), (Start: 15 @9174 has 23 MA's), (27, 9246), (39, 9369), (42, 9393), (45, 9405), (46, 9432),

Gene: CocoaPuff\_13 Start: 8637, Stop: 8912, Start Num: 16  
Candidate Starts for CocoaPuff\_13:  
(Start: 16 @8637 has 42 MA's), (27, 8709), (39, 8832), (42, 8856), (45, 8868),

Gene: Cozz\_14 Start: 8886, Stop: 9191, Start Num: 16  
Candidate Starts for Cozz\_14:  
(Start: 16 @8886 has 42 MA's), (27, 8970), (37, 9084), (38, 9090), (39, 9093), (42, 9117), (45, 9129),

Gene: Dre3\_14 Start: 9121, Stop: 9396, Start Num: 15  
Candidate Starts for Dre3\_14:  
(13, 9112), (Start: 15 @9121 has 23 MA's), (27, 9193), (39, 9316), (42, 9340), (45, 9352), (46, 9379),

Gene: ElJefes\_13 Start: 9112, Stop: 9387, Start Num: 16  
Candidate Starts for ElJefes\_13:  
(Start: 16 @9112 has 42 MA's), (27, 9184), (39, 9307), (42, 9331), (45, 9343),

Gene: Elinal\_15 Start: 8643, Stop: 8918, Start Num: 16  
Candidate Starts for Elinal\_15:  
(Start: 16 @8643 has 42 MA's), (27, 8715), (39, 8838), (42, 8862), (45, 8874),

Gene: Elliott\_14 Start: 8885, Stop: 9190, Start Num: 16  
Candidate Starts for Elliott\_14:  
(Start: 16 @8885 has 42 MA's), (27, 8969), (39, 9092), (42, 9116), (45, 9128),

Gene: Emalyn\_13 Start: 8612, Stop: 8905, Start Num: 16  
Candidate Starts for Emalyn\_13:  
(Start: 16 @8612 has 42 MA's), (27, 8684), (39, 8807), (42, 8831), (45, 8843), (46, 8870),

Gene: Feastonyeet\_13 Start: 8662, Stop: 8937, Start Num: 16  
Candidate Starts for Feastonyeet\_13:  
(Start: 16 @8662 has 42 MA's), (27, 8734), (34, 8830), (39, 8857), (42, 8881), (45, 8893), (47, 8926),

Gene: Fribs8\_15 Start: 9689, Stop: 9964, Start Num: 16  
Candidate Starts for Fribs8\_15:  
(6, 9578), (7, 9581), (Start: 16 @9689 has 42 MA's), (27, 9761), (34, 9857), (39, 9884), (42, 9908), (45, 9920), (46, 9947),

Gene: Frickyeah\_15 Start: 8335, Stop: 8613, Start Num: 17  
Candidate Starts for Frickyeah\_15:  
(12, 8314), (Start: 17 @8335 has 6 MA's), (36, 8500), (43, 8554), (44, 8560), (45, 8563), (46, 8590),

Gene: GTE2\_12 Start: 8563, Stop: 8856, Start Num: 16  
Candidate Starts for GTE2\_12:  
(Start: 10 @8527 has 1 MA's), (Start: 16 @8563 has 42 MA's), (27, 8635), (39, 8758), (42, 8782), (45, 8794), (46, 8821),

Gene: Getalong\_15 Start: 8315, Stop: 8596, Start Num: 15  
Candidate Starts for Getalong\_15:

(Start: 15 @8315 has 23 MA's), (36, 8480), (43, 8534), (44, 8540), (45, 8543), (46, 8570),

Gene: GiKK\_17 Start: 9200, Stop: 9493, Start Num: 18

Candidate Starts for GiKK\_17:

(11, 9167), (Start: 18 @9200 has 8 MA's), (22, 9230), (29, 9305), (39, 9392), (42, 9416), (45, 9428), (47, 9461),

Gene: Gibbous\_14 Start: 9121, Stop: 9396, Start Num: 15

Candidate Starts for Gibbous\_14:

(13, 9112), (Start: 15 @9121 has 23 MA's), (27, 9193), (39, 9316), (42, 9340), (45, 9352), (46, 9379),

Gene: GoldHunter\_15 Start: 8886, Stop: 9191, Start Num: 16

Candidate Starts for GoldHunter\_15:

(Start: 16 @8886 has 42 MA's), (27, 8970), (37, 9084), (38, 9090), (39, 9093), (42, 9117), (45, 9129),

Gene: Hexbug\_16 Start: 9883, Stop: 10176, Start Num: 18

Candidate Starts for Hexbug\_16:

(Start: 18 @9883 has 8 MA's), (24, 9937), (26, 9940), (45, 10111), (47, 10144),

Gene: HippoPololi\_16 Start: 9778, Stop: 10053, Start Num: 15

Candidate Starts for HippoPololi\_16:

(13, 9769), (Start: 15 @9778 has 23 MA's), (27, 9850), (34, 9946), (39, 9973), (42, 9997), (45, 10009), (46, 10036),

Gene: Holliday\_16 Start: 8319, Stop: 8597, Start Num: 15

Candidate Starts for Holliday\_16:

(8, 8271), (Start: 15 @8319 has 23 MA's), (36, 8484), (43, 8538), (44, 8544), (45, 8547), (46, 8574),

Gene: Horseradish\_15 Start: 8771, Stop: 9064, Start Num: 16

Candidate Starts for Horseradish\_15:

(Start: 16 @8771 has 42 MA's), (39, 8966), (42, 8990), (45, 9002), (46, 9029),

Gene: Horus\_15 Start: 8335, Stop: 8613, Start Num: 17

Candidate Starts for Horus\_15:

(12, 8314), (Start: 17 @8335 has 6 MA's), (36, 8500), (43, 8554), (44, 8560), (45, 8563), (46, 8590),

Gene: Jamzy\_17 Start: 9210, Stop: 9503, Start Num: 18

Candidate Starts for Jamzy\_17:

(11, 9177), (Start: 18 @9210 has 8 MA's), (22, 9240), (29, 9315), (39, 9402), (42, 9426), (45, 9438), (47, 9471),

Gene: Kamaru\_15 Start: 8319, Stop: 8597, Start Num: 15

Candidate Starts for Kamaru\_15:

(8, 8271), (Start: 15 @8319 has 23 MA's), (36, 8484), (43, 8538), (44, 8544), (45, 8547), (46, 8574),

Gene: KayGee\_14 Start: 8643, Stop: 8918, Start Num: 16

Candidate Starts for KayGee\_14:

(Start: 16 @8643 has 42 MA's), (27, 8715), (39, 8838), (42, 8862), (45, 8874),

Gene: Lauer\_13 Start: 8692, Stop: 8967, Start Num: 16

Candidate Starts for Lauer\_13:

(Start: 16 @8692 has 42 MA's), (27, 8764), (39, 8887), (42, 8911), (45, 8923), (47, 8956),

Gene: Leroy\_15 Start: 8336, Stop: 8614, Start Num: 17  
Candidate Starts for Leroy\_15:  
(12, 8315), (Start: 17 @8336 has 6 MA's), (36, 8501), (43, 8555), (44, 8561), (45, 8564), (46, 8591),

Gene: LitninMcQueen\_15 Start: 8320, Stop: 8598, Start Num: 15  
Candidate Starts for LitninMcQueen\_15:  
(Start: 15 @8320 has 23 MA's), (36, 8485), (43, 8539), (44, 8545), (45, 8548), (46, 8575),

Gene: Lutum\_15 Start: 8335, Stop: 8613, Start Num: 17  
Candidate Starts for Lutum\_15:  
(12, 8314), (Start: 17 @8335 has 6 MA's), (36, 8500), (43, 8554), (44, 8560), (45, 8563), (46, 8590),

Gene: MAnor\_14 Start: 8635, Stop: 8910, Start Num: 16  
Candidate Starts for MAnor\_14:  
(Start: 16 @8635 has 42 MA's), (27, 8707), (39, 8830), (42, 8854), (45, 8866),

Gene: MScarn\_16 Start: 8857, Stop: 9150, Start Num: 16  
Candidate Starts for MScarn\_16:  
(Start: 9 @8815 has 1 MA's), (Start: 16 @8857 has 42 MA's), (39, 9052), (42, 9076), (45, 9088), (46, 9115),

Gene: MaVan\_16 Start: 9884, Stop: 10159, Start Num: 15  
Candidate Starts for MaVan\_16:  
(13, 9875), (Start: 15 @9884 has 23 MA's), (21, 9914), (26, 9944), (39, 10079), (42, 10103), (45, 10115),

Gene: Malisha\_16 Start: 10116, Stop: 10397, Start Num: 15  
Candidate Starts for Malisha\_16:  
(Start: 15 @10116 has 23 MA's), (36, 10281), (43, 10335), (44, 10341), (45, 10344), (46, 10371),

Gene: Malvina\_16 Start: 9781, Stop: 10056, Start Num: 15  
Candidate Starts for Malvina\_16:  
(13, 9772), (Start: 15 @9781 has 23 MA's), (27, 9853), (34, 9949), (39, 9976), (42, 10000), (45, 10012), (46, 10039),

Gene: Margaret\_17 Start: 9558, Stop: 9884, Start Num: 10  
Candidate Starts for Margaret\_17:  
(2, 9264), (3, 9306), (4, 9381), (5, 9432), (Start: 10 @9558 has 1 MA's), (14, 9582), (Start: 18 @9591 has 8 MA's), (22, 9621), (26, 9648), (32, 9744), (39, 9783), (44, 9816), (45, 9819), (47, 9852),

Gene: Mayweather\_15 Start: 9265, Stop: 9540, Start Num: 16  
Candidate Starts for Mayweather\_15:  
(Start: 16 @9265 has 42 MA's), (27, 9337), (39, 9460), (42, 9484), (45, 9496),

Gene: McDazzle\_13 Start: 9106, Stop: 9381, Start Num: 16  
Candidate Starts for McDazzle\_13:  
(Start: 16 @9106 has 42 MA's), (27, 9178), (39, 9301), (42, 9325), (45, 9337),

Gene: MunkgeeRoachy\_14 Start: 8933, Stop: 9238, Start Num: 16  
Candidate Starts for MunkgeeRoachy\_14:  
(Start: 16 @8933 has 42 MA's), (27, 9017), (38, 9137), (39, 9140), (42, 9164), (45, 9176),

Gene: Nebkiss\_11 Start: 8761, Stop: 9018, Start Num: 20

Candidate Starts for Nebkiss\_11:

(Start: 20 @8761 has 1 MA's), (26, 8806), (31, 8890), (32, 8899), (35, 8914), (38, 8935), (41, 8959),

Gene: Nibbles\_16 Start: 9884, Stop: 10159, Start Num: 15

Candidate Starts for Nibbles\_16:

(13, 9875), (Start: 15 @9884 has 23 MA's), (21, 9914), (23, 9923), (26, 9944), (39, 10079), (42, 10103), (45, 10115),

Gene: Nina\_15 Start: 9918, Stop: 10223, Start Num: 16

Candidate Starts for Nina\_15:

(Start: 16 @9918 has 42 MA's), (27, 10002), (38, 10122), (39, 10125), (42, 10149), (45, 10161),

Gene: Nodigi\_16 Start: 9874, Stop: 10167, Start Num: 18

Candidate Starts for Nodigi\_16:

(Start: 18 @9874 has 8 MA's), (22, 9904), (39, 10066), (45, 10102), (47, 10135),

Gene: Orla\_16 Start: 9878, Stop: 10171, Start Num: 18

Candidate Starts for Orla\_16:

(Start: 18 @9878 has 8 MA's), (22, 9908), (39, 10070), (45, 10106), (47, 10139),

Gene: Periwinkle\_15 Start: 8315, Stop: 8593, Start Num: 15

Candidate Starts for Periwinkle\_15:

(Start: 15 @8315 has 23 MA's), (36, 8480), (43, 8534), (44, 8540), (45, 8543), (46, 8570),

Gene: Phabuloso\_15 Start: 8320, Stop: 8598, Start Num: 15

Candidate Starts for Phabuloso\_15:

(Start: 15 @8320 has 23 MA's), (36, 8485), (43, 8539), (44, 8545), (45, 8548), (46, 8575),

Gene: Phistory\_15 Start: 8304, Stop: 8582, Start Num: 15

Candidate Starts for Phistory\_15:

(Start: 15 @8304 has 23 MA's), (36, 8469), (43, 8523), (44, 8529), (45, 8532), (46, 8559),

Gene: Pons\_14 Start: 8643, Stop: 8918, Start Num: 16

Candidate Starts for Pons\_14:

(Start: 16 @8643 has 42 MA's), (27, 8715), (39, 8838), (42, 8862), (45, 8874),

Gene: PotPie\_14 Start: 9496, Stop: 9771, Start Num: 16

Candidate Starts for PotPie\_14:

(Start: 16 @9496 has 42 MA's), (27, 9568), (39, 9691), (42, 9715), (45, 9727), (47, 9760),

Gene: PsychoKiller\_14 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for PsychoKiller\_14:

(Start: 16 @8885 has 42 MA's), (27, 8969), (39, 9092), (42, 9116), (45, 9128),

Gene: Quasar\_15 Start: 9494, Stop: 9799, Start Num: 16

Candidate Starts for Quasar\_15:

(Start: 16 @9494 has 42 MA's), (27, 9578), (39, 9701), (42, 9725), (45, 9737),

Gene: RADical\_15 Start: 8886, Stop: 9191, Start Num: 16

Candidate Starts for RADical\_15:

(Start: 16 @8886 has 42 MA's), (27, 8970), (38, 9090), (39, 9093), (42, 9117), (45, 9129),

Gene: RSchmailzl\_15 Start: 9029, Stop: 9334, Start Num: 16

Candidate Starts for RSchmailzl\_15:

(Start: 16 @9029 has 42 MA's), (27, 9113), (37, 9227), (38, 9233), (39, 9236), (42, 9260), (45, 9272),

Gene: RanchParmCat\_17 Start: 9591, Stop: 9884, Start Num: 18

Candidate Starts for RanchParmCat\_17:

(14, 9582), (Start: 18 @9591 has 8 MA's), (22, 9621), (26, 9648), (32, 9744), (39, 9783), (44, 9816), (45, 9819), (47, 9852),

Gene: RedBaron\_16 Start: 8929, Stop: 9234, Start Num: 16

Candidate Starts for RedBaron\_16:

(Start: 16 @8929 has 42 MA's), (27, 9013), (28, 9019), (37, 9127), (38, 9133), (39, 9136), (42, 9160), (45, 9172),

Gene: ShawBrad\_15 Start: 8340, Stop: 8618, Start Num: 17

Candidate Starts for ShawBrad\_15:

(12, 8319), (Start: 17 @8340 has 6 MA's), (36, 8505), (43, 8559), (44, 8565), (45, 8568), (46, 8595),

Gene: SheckWes\_13 Start: 8631, Stop: 8906, Start Num: 16

Candidate Starts for SheckWes\_13:

(Start: 16 @8631 has 42 MA's), (27, 8703), (39, 8826), (42, 8850), (45, 8862),

Gene: SketchMex\_13 Start: 8872, Stop: 9165, Start Num: 16

Candidate Starts for SketchMex\_13:

(Start: 9 @8830 has 1 MA's), (Start: 16 @8872 has 42 MA's), (39, 9067), (42, 9091), (45, 9103), (46, 9130),

Gene: Socotra\_15 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Socotra\_15:

(Start: 16 @8885 has 42 MA's), (27, 8969), (29, 9005), (39, 9092), (42, 9116), (45, 9128),

Gene: Sopespian\_14 Start: 8886, Stop: 9191, Start Num: 16

Candidate Starts for Sopespian\_14:

(1, 8451), (Start: 16 @8886 has 42 MA's), (27, 8970), (39, 9093), (42, 9117), (45, 9129),

Gene: Spooky\_15 Start: 8326, Stop: 8601, Start Num: 15

Candidate Starts for Spooky\_15:

(Start: 15 @8326 has 23 MA's), (40, 8527), (43, 8545), (44, 8551), (45, 8554),

Gene: Squiddly\_17 Start: 9737, Stop: 10018, Start Num: 15

Candidate Starts for Squiddly\_17:

(Start: 15 @9737 has 23 MA's), (36, 9902), (43, 9956), (44, 9962), (45, 9965), (46, 9992),

Gene: Starburst\_15 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Starburst\_15:

(Start: 16 @8885 has 42 MA's), (27, 8969), (38, 9089), (39, 9092), (42, 9116), (45, 9128),

Gene: SteamedHams\_16 Start: 8902, Stop: 9195, Start Num: 16

Candidate Starts for SteamedHams\_16:

(Start: 16 @8902 has 42 MA's), (27, 8974), (28, 8980), (39, 9097), (42, 9121), (45, 9133), (46, 9160),

Gene: Stellammi\_11 Start: 7669, Stop: 7914, Start Num: 19

Candidate Starts for Stellammi\_11:

(Start: 19 @7669 has 1 MA's), (28, 7717), (29, 7747), (30, 7750), (31, 7783), (32, 7792), (35, 7807), (40, 7840), (44, 7864),

Gene: SummitAcademy\_13 Start: 8711, Stop: 8986, Start Num: 16

Candidate Starts for SummitAcademy\_13:

(Start: 16 @8711 has 42 MA's), (27, 8783), (39, 8906), (42, 8930), (45, 8942), (47, 8975),

Gene: Survivors\_16 Start: 9739, Stop: 10014, Start Num: 15

Candidate Starts for Survivors\_16:

(13, 9730), (Start: 15 @9739 has 23 MA's), (26, 9799), (33, 9898), (39, 9934), (42, 9958), (45, 9970),

Gene: SweatNTears\_16 Start: 9383, Stop: 9676, Start Num: 16

Candidate Starts for SweatNTears\_16:

(Start: 9 @9341 has 1 MA's), (Start: 16 @9383 has 42 MA's), (39, 9578), (42, 9602), (45, 9614), (46, 9641),

Gene: Tarnish\_14 Start: 9010, Stop: 9285, Start Num: 16

Candidate Starts for Tarnish\_14:

(Start: 16 @9010 has 42 MA's), (27, 9082), (39, 9205), (42, 9229), (45, 9241),

Gene: Tolls\_16 Start: 8905, Stop: 9198, Start Num: 16

Candidate Starts for Tolls\_16:

(Start: 16 @8905 has 42 MA's), (27, 8977), (28, 8983), (39, 9100), (42, 9124), (45, 9136), (46, 9163),

Gene: Troje\_14 Start: 8815, Stop: 9150, Start Num: 9

Candidate Starts for Troje\_14:

(Start: 9 @8815 has 1 MA's), (Start: 16 @8857 has 42 MA's), (39, 9052), (42, 9076), (45, 9088), (46, 9115),

Gene: Typhonomachy\_14 Start: 8885, Stop: 9190, Start Num: 16

Candidate Starts for Typhonomachy\_14:

(Start: 16 @8885 has 42 MA's), (27, 8969), (38, 9089), (39, 9092), (42, 9116), (45, 9128),

Gene: Vine\_15 Start: 9640, Stop: 9915, Start Num: 16

Candidate Starts for Vine\_15:

(Start: 16 @9640 has 42 MA's), (27, 9712), (39, 9835), (42, 9859), (45, 9871),

Gene: Wallaby\_18 Start: 9883, Stop: 10158, Start Num: 15

Candidate Starts for Wallaby\_18:

(13, 9874), (Start: 15 @9883 has 23 MA's), (21, 9913), (26, 9943), (39, 10078), (42, 10102), (45, 10114),

Gene: Whitney\_15 Start: 8315, Stop: 8596, Start Num: 15

Candidate Starts for Whitney\_15:

(Start: 15 @8315 has 23 MA's), (36, 8480), (43, 8534), (44, 8540), (45, 8543), (46, 8570),

Gene: Wolfwood\_16 Start: 9883, Stop: 10158, Start Num: 15

Candidate Starts for Wolfwood\_16:

(13, 9874), (Start: 15 @9883 has 23 MA's), (21, 9913), (26, 9943), (39, 10078), (42, 10102), (45, 10114),

Gene: Yakult\_15 Start: 8776, Stop: 9066, Start Num: 18

Candidate Starts for Yakult\_15:

(Start: 18 @8776 has 8 MA's), (21, 8803), (26, 8833), (27, 8845), (45, 9004), (47, 9037),

Gene: Yarn\_13 Start: 8895, Stop: 9188, Start Num: 16

Candidate Starts for Yarn\_13:

(Start: 16 @8895 has 42 MA's), (27, 8967), (28, 8973), (39, 9090), (42, 9114), (45, 9126), (46, 9153),

Gene: Yucky\_14 Start: 9500, Stop: 9775, Start Num: 16

Candidate Starts for Yucky\_14:

(Start: 16 @9500 has 42 MA's), (27, 9572), (39, 9695), (42, 9719), (45, 9731),

Gene: Yummy\_15 Start: 8771, Stop: 9064, Start Num: 16

Candidate Starts for Yummy\_15:

(Start: 16 @8771 has 42 MA's), (39, 8966), (42, 8990), (45, 9002), (46, 9029),

Gene: Zareef\_16 Start: 9885, Stop: 10160, Start Num: 15

Candidate Starts for Zareef\_16:

(13, 9876), (Start: 15 @9885 has 23 MA's), (21, 9915), (26, 9945), (39, 10080), (42, 10104), (45, 10116),