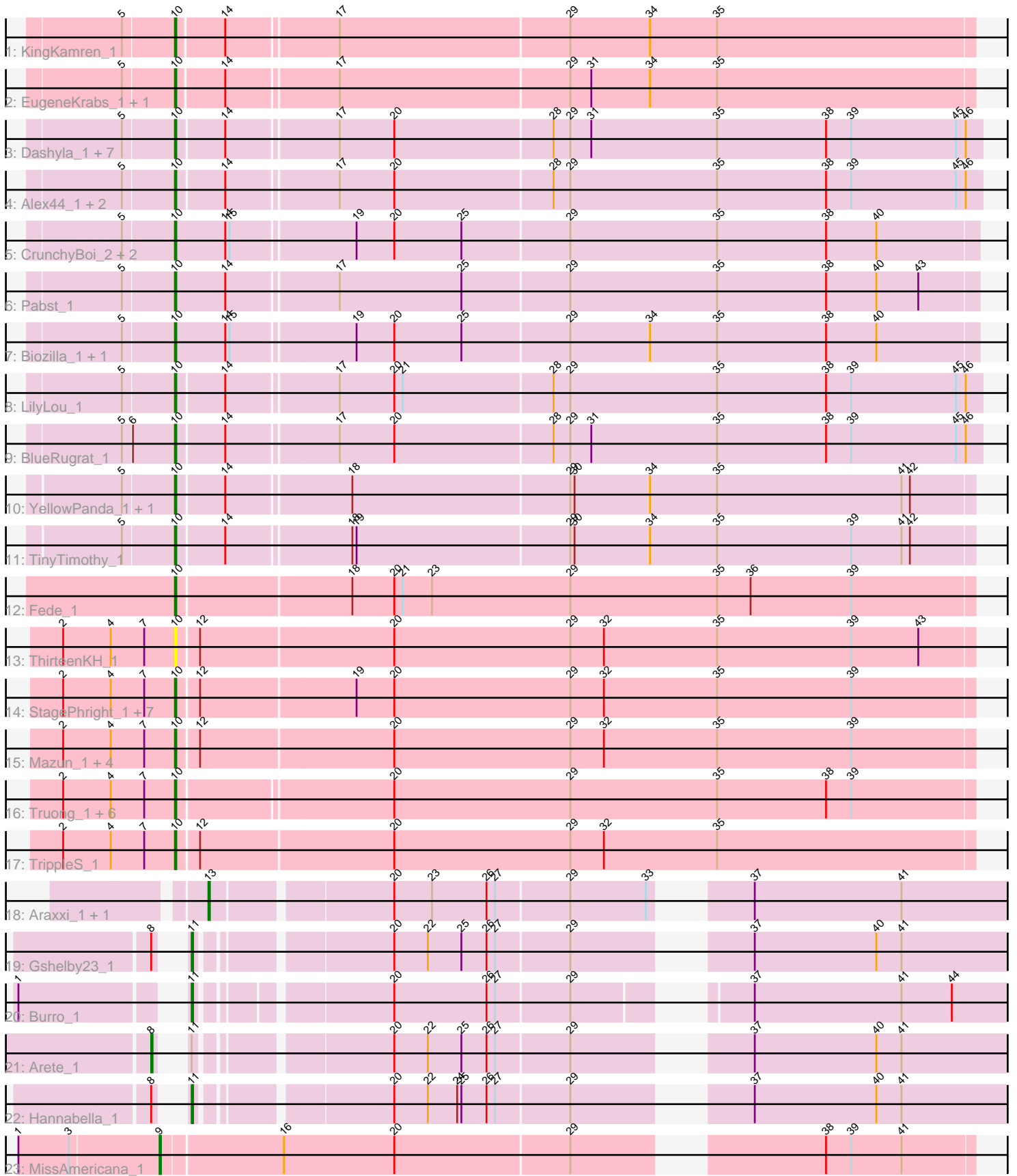


Pham 194052



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 194052 Report

This analysis was run 11/02/24 on database version 579.

Pham number 194052 has 55 members, 5 are drafts.

Phages represented in each track:

- Track 1 : KingKamren\_1
- Track 2 : EugeneKrabs\_1, Zhengyi\_1
- Track 3 : Dashyla\_1, Corn21\_1, Unphazed\_1, Stormbreaker\_1, DumpQuist\_1, Xitlalli\_1, Birdfeeder\_1, ArMaWen\_1
- Track 4 : Alex44\_1, Phogo\_1, LesNorah\_1
- Track 5 : CrunchyBoi\_2, PineapplePluto\_2, Oatly\_1
- Track 6 : Pabst\_1
- Track 7 : Biozilla\_1, HitchHiker\_2
- Track 8 : LilyLou\_1
- Track 9 : BlueRugrat\_1
- Track 10 : YellowPanda\_1, Wesak\_1
- Track 11 : TinyTimothy\_1
- Track 12 : Fede\_1
- Track 13 : ThirteenKH\_1
- Track 14 : StagePhright\_1, Phractured\_1, Astartes\_1, Phedro\_1, PhriedRice\_1, Pharky\_1, Moleficent\_1, Fullmetal\_1
- Track 15 : Mazun\_1, RicoCaldo\_1, Atraxi\_1, Morrill\_1, Yafa\_1
- Track 16 : Truong\_1, JordanFarm\_1, Barroma\_1, AloeVera\_1, Waterlily\_1, Akoni\_1, Ashton\_1
- Track 17 : TrippleS\_1
- Track 18 : Araxxi\_1, DoTi\_1
- Track 19 : Gshelby23\_1
- Track 20 : Burro\_1
- Track 21 : Arete\_1
- Track 22 : Hannabella\_1
- Track 23 : MissAmericana\_1

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

The start number called the most often in the published annotations is 10, it was called in 43 of the 50 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Akoni\_1, Alex44\_1, AloeVera\_1, ArMaWen\_1, Ashton\_1, Astartes\_1, Atraxi\_1, Barroma\_1, Biozilla\_1, Birdfeeder\_1, BlueRugrat\_1, Corn21\_1, CrunchyBoi\_2, Dashyla\_1, DumpQuist\_1, EugeneKrabs\_1, Fede\_1, Fullmetal\_1, HitchHiker\_2, JordanFarm\_1, KingKamren\_1, LesNorah\_1, LilyLou\_1, Mazun\_1, Moleficent\_1, Morrill\_1, Oatly\_1, Pabst\_1, Pharky\_1, Phedro\_1, Phogo\_1, Phracted\_1, PhriedRice\_1, PineapplePluto\_2, RicoCaldo\_1, StagePhright\_1, Stormbreaker\_1, ThirteenKH\_1, TinyTimothy\_1, TrippleS\_1, Truong\_1, Unphazed\_1, Waterlily\_1, Wesak\_1, Xitlalli\_1, Yafa\_1, YellowPanda\_1, Zhengyi\_1,

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

- 

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

- Araxxi\_1, Arete\_1, Burro\_1, DoTi\_1, Gshelby23\_1, Hannabella\_1, MissAmericana\_1,

### Summary by start number:

Start 8:

- Found in 3 of 55 ( 5.5% ) of genes in pham
- Manual Annotations of this start: 1 of 50
- Called 33.3% of time when present
- Phage (with cluster) where this start called: Arete\_1 (EM1),

Start 9:

- Found in 1 of 55 ( 1.8% ) of genes in pham
- Manual Annotations of this start: 1 of 50
- Called 100.0% of time when present
- Phage (with cluster) where this start called: MissAmericana\_1 (EM2),

Start 10:

- Found in 48 of 55 ( 87.3% ) of genes in pham
- Manual Annotations of this start: 43 of 50
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Akoni\_1 (EK2), Alex44\_1 (EK1), AloeVera\_1 (EK2), ArMaWen\_1 (EK1), Ashton\_1 (EK2), Astartes\_1 (EK2), Atraxi\_1 (EK2), Barroma\_1 (EK2), Biozilla\_1 (EK1), Birdfeeder\_1 (EK1), BlueRugrat\_1 (EK1), Corn21\_1 (EK1), CrunchyBoi\_2 (EK1), Dashyla\_1 (EK1), DumpQuist\_1 (EK1), EugeneKrabs\_1 (EK), Fede\_1 (EK2), Fullmetal\_1 (EK2), HitchHiker\_2 (EK1), JordanFarm\_1 (EK2), KingKamren\_1 (EK), LesNorah\_1 (EK1), LilyLou\_1 (EK1), Mazun\_1 (EK2), Moleficent\_1 (EK2), Morrill\_1 (EK2), Oatly\_1 (EK1), Pabst\_1 (EK1), Pharky\_1 (EK2), Phedro\_1 (EK2), Phogo\_1 (EK1), Phracted\_1 (EK2), PhriedRice\_1 (EK2), PineapplePluto\_2 (EK1), RicoCaldo\_1 (EK2), StagePhright\_1 (EK2), Stormbreaker\_1 (EK1), ThirteenKH\_1 (EK2), TinyTimothy\_1 (EK1), TrippleS\_1 (EK2), Truong\_1 (EK2), Unphazed\_1 (EK1), Waterlily\_1 (EK2), Wesak\_1 (EK1), Xitlalli\_1 (EK1), Yafa\_1 (EK2), YellowPanda\_1 (EK1), Zhengyi\_1 (EK),

Start 11:

- Found in 4 of 55 ( 7.3% ) of genes in pham
- Manual Annotations of this start: 3 of 50
- Called 75.0% of time when present
- Phage (with cluster) where this start called: Burro\_1 (EM1), Gshelby23\_1 (EM1), Hannabella\_1 (EM1),

Start 13:

- Found in 2 of 55 ( 3.6% ) of genes in pham
- Manual Annotations of this start: 2 of 50
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Araxxi\_1 (EM1), DoTi\_1 (EM1),

### **Summary by clusters:**

There are 5 clusters represented in this pham: EK, EM1, EK2, EK1, EM2,

Info for manual annotations of cluster EK:

- Start number 10 was manually annotated 3 times for cluster EK.

Info for manual annotations of cluster EK1:

- Start number 10 was manually annotated 20 times for cluster EK1.

Info for manual annotations of cluster EK2:

- Start number 10 was manually annotated 20 times for cluster EK2.

Info for manual annotations of cluster EM1:

- Start number 8 was manually annotated 1 time for cluster EM1.
- Start number 11 was manually annotated 3 times for cluster EM1.
- Start number 13 was manually annotated 2 times for cluster EM1.

Info for manual annotations of cluster EM2:

- Start number 9 was manually annotated 1 time for cluster EM2.

### **Gene Information:**

Gene: Akoni\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for Akoni\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: Alex44\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Alex44\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: AloeVera\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for AloeVera\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: ArMaWen\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for ArMaWen\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Araxxi\_1 Start: 516, Stop: 1, Start Num: 13

Candidate Starts for Araxxi\_1:

(Start: 13 @516 has 2 MA's), (20, 399), (23, 372), (26, 333), (27, 327), (29, 276), (33, 222), (37, 183), (41, 78),

Gene: Arete\_1 Start: 525, Stop: 1, Start Num: 8

Candidate Starts for Arete\_1:

(Start: 8 @525 has 1 MA's), (Start: 11 @519 has 3 MA's), (20, 399), (22, 375), (25, 351), (26, 333), (27, 327), (29, 276), (37, 183), (40, 96), (41, 78),

Gene: Ashton\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for Ashton\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: Astartes\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Astartes\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Atraxi\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Atraxi\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Barroma\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for Barroma\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: Biozilla\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Biozilla\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (15, 525), (19, 441), (20, 414), (25, 366), (29, 291), (34, 234), (35, 186), (38, 108), (40, 72),

Gene: Birdfeeder\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Birdfeeder\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: BlueRugrat\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for BlueRugrat\_1:

(5, 600), (6, 594), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Burro\_1 Start: 510, Stop: 1, Start Num: 11

Candidate Starts for Burro\_1:

(1, 606), (Start: 11 @510 has 3 MA's), (20, 393), (26, 327), (27, 321), (29, 270), (37, 183), (41, 78), (44, 42),

Gene: Corn21\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Corn21\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: CrunchyBoi\_2 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for CrunchyBoi\_2:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (15, 525), (19, 441), (20, 414), (25, 366), (29, 291), (35, 186), (38, 108), (40, 72),

Gene: Dashyla\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Dashyla\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: DoTi\_1 Start: 516, Stop: 1, Start Num: 13

Candidate Starts for DoTi\_1:

(Start: 13 @516 has 2 MA's), (20, 399), (23, 372), (26, 333), (27, 327), (29, 276), (33, 222), (37, 183), (41, 78),

Gene: DumpQuist\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for DumpQuist\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: EugeneKrabs\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for EugeneKrabs\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (17, 450), (29, 288), (31, 273), (34, 231), (35, 183),

Gene: Fede\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Fede\_1:

(Start: 10 @564 has 43 MA's), (18, 444), (20, 414), (21, 408), (23, 387), (29, 288), (35, 183), (36, 159), (39, 87),

Gene: Fullmetal\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Fullmetal\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Gshelby23\_1 Start: 519, Stop: 1, Start Num: 11

Candidate Starts for Gshelby23\_1:

(Start: 8 @525 has 1 MA's), (Start: 11 @519 has 3 MA's), (20, 399), (22, 375), (25, 351), (26, 333), (27, 327), (29, 276), (37, 183), (40, 96), (41, 78),

Gene: Hannabella\_1 Start: 519, Stop: 1, Start Num: 11

Candidate Starts for Hannabella\_1:

(Start: 8 @525 has 1 MA's), (Start: 11 @519 has 3 MA's), (20, 399), (22, 375), (24, 354), (25, 351), (26, 333), (27, 327), (29, 276), (37, 183), (40, 96), (41, 78),

Gene: HitchHiker\_2 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for HitchHiker\_2:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (15, 525), (19, 441), (20, 414), (25, 366), (29, 291), (34, 234), (35, 186), (38, 108), (40, 72),

Gene: JordanFarm\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for JordanFarm\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: KingKamren\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for KingKamren\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (17, 450), (29, 288), (34, 231), (35, 183),

Gene: LesNorah\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for LesNorah\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: LilyLou\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for LilyLou\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (21, 411), (28, 306), (29, 294), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Mazun\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Mazun\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: MissAmericana\_1 Start: 534, Stop: 1, Start Num: 9

Candidate Starts for MissAmericana\_1:

(1, 633), (3, 597), (Start: 9 @534 has 1 MA's), (16, 450), (20, 372), (29, 249), (38, 105), (39, 87), (41, 51),

Gene: Moleficient\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Moleficient\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Morrill\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Morrill\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Oatly\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Oatly\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (15, 525), (19, 441), (20, 414), (25, 366), (29, 291), (35, 186), (38, 108), (40, 72),

Gene: Pabst\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Pabst\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (17, 453), (25, 366), (29, 291), (35, 186), (38, 108), (40, 72), (43, 42),

Gene: Pharky\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Pharky\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Phedro\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Phedro\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Phogo\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Phogo\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Phractured\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Phractured\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: PhriedRice\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for PhriedRice\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: PineapplePluto\_2 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for PineapplePluto\_2:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 528), (15, 525), (19, 441), (20, 414), (25, 366), (29, 291), (35, 186), (38, 108), (40, 72),

Gene: RicoCaldo\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for RicoCaldo\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: StagePhright\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for StagePhright\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (19, 441), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: Stormbreaker\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Stormbreaker\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: ThirteenKH\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for ThirteenKH\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87), (43, 39),

Gene: TinyTimothy\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for TinyTimothy\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (18, 441), (19, 438), (29, 288), (30, 285), (34, 231), (35, 183), (39, 87), (41, 51), (42, 45),

Gene: TrippleS\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for TrippleS\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183),



Gene: Truong\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for Truong\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: Unphazed\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Unphazed\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Waterlily\_1 Start: 561, Stop: 1, Start Num: 10

Candidate Starts for Waterlily\_1:

(2, 639), (4, 606), (7, 582), (Start: 10 @561 has 43 MA's), (20, 414), (29, 288), (35, 183), (38, 105), (39, 87),

Gene: Wesak\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for Wesak\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (18, 441), (29, 288), (30, 285), (34, 231), (35, 183), (41, 51), (42, 45),

Gene: Xitlalli\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Xitlalli\_1:

(5, 600), (Start: 10 @564 has 43 MA's), (14, 531), (17, 456), (20, 417), (28, 306), (29, 294), (31, 279), (35, 189), (38, 111), (39, 93), (45, 18), (46, 12),

Gene: Yafa\_1 Start: 564, Stop: 1, Start Num: 10

Candidate Starts for Yafa\_1:

(2, 642), (4, 609), (7, 585), (Start: 10 @564 has 43 MA's), (12, 549), (20, 414), (29, 288), (32, 264), (35, 183), (39, 87),

Gene: YellowPanda\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for YellowPanda\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (18, 441), (29, 288), (30, 285), (34, 231), (35, 183), (41, 51), (42, 45),

Gene: Zhengyi\_1 Start: 558, Stop: 1, Start Num: 10

Candidate Starts for Zhengyi\_1:

(5, 594), (Start: 10 @558 has 43 MA's), (14, 525), (17, 450), (29, 288), (31, 273), (34, 231), (35, 183),