

Reconstructing Repeat-Annotated Phylogenetic Trees

Firas Swidan

Michal Ziv-Ukelson

Ron Y. Pinter

Overview

On Thieves

Evolution

On Thieves Evolution

A full version is to appear in JCB and can be accessed through
<http://magicmapping.sourceforge.net/download/repeatPhylos.pdf>

On Thieves

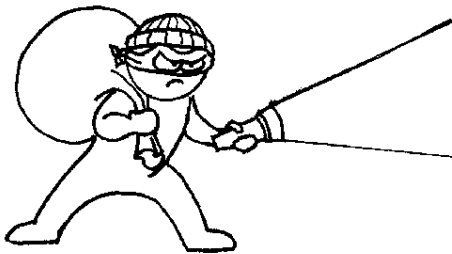
- ❖ Thieves
- ❖ Inspectors
- ❖ Candidates
- ❖ Footprints
- ❖ Thief found

Evolution

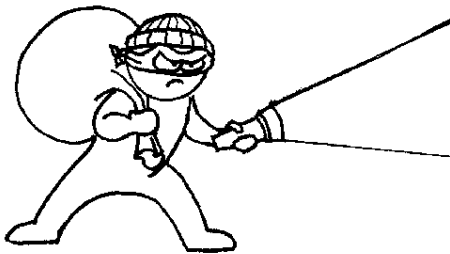
On Thieves

What is a thief?

What is a thief?



What is a thief?



Evolution and thieves

On Thieves

❖ Thieves

❖ Inspectors

❖ Candidates

❖ Footprints

❖ Thief found

Evolution

Thief = Change!

Evolution and thieves

On Thieves

❖ Thieves

❖ Inspectors

❖ Candidates

❖ Footprints

❖ Thief found

Evolution

Thief = Change!



Inspectors



Inspectors



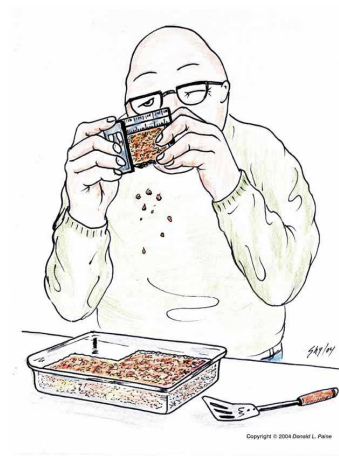
Inspectors



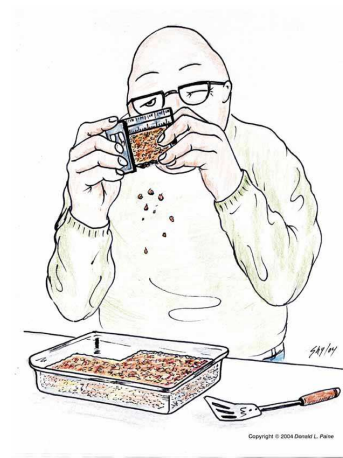
Inspectors



Inspectors



Inspectors



Candidates

On Thieves

- ❖ Thieves
- ❖ Inspectors
- ❖ **Candidates**
- ❖ Footprints
- ❖ Thief found

Evolution



Candidates

On Thieves

- ❖ Thieves
- ❖ Inspectors
- ❖ **Candidates**
- ❖ Footprints
- ❖ Thief found

Evolution



Footprints

On Thieves

- ❖ Thieves
- ❖ Inspectors
- ❖ Candidates
- ❖ **Footprints**
- ❖ Thief found

Evolution



Footprints

On Thieves

- ❖ Thieves
- ❖ Inspectors
- ❖ Candidates
- ❖ **Footprints**
- ❖ Thief found

Evolution

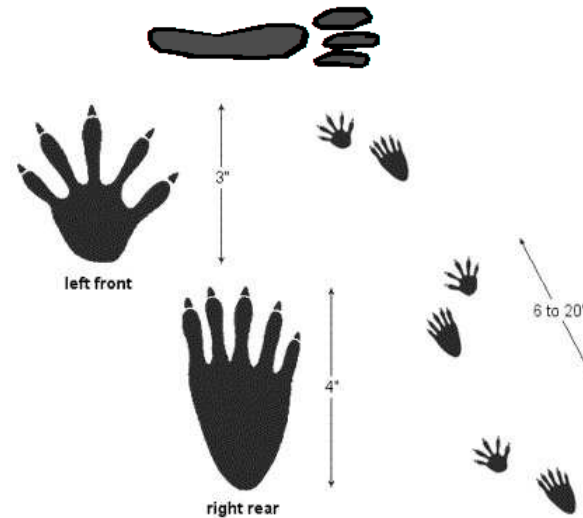


Footprints

On Thieves

- ❖ Thieves
- ❖ Inspectors
- ❖ Candidates
- ❖ **Footprints**
- ❖ Thief found

Evolution



Thief found

On Thieves

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- ❖ Inspectors
- ❖ Candidates
- ❖ Footprints
- ❖ **Thief found**

Evolution



Thief found

On Thieves

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- ❖ Candidates
- ❖ Footprints
- ❖ **Thief found**

Evolution



Thief found

On Thieves

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- ❖ Footprints
- ❖ **Thief found**

Evolution



On Thieves

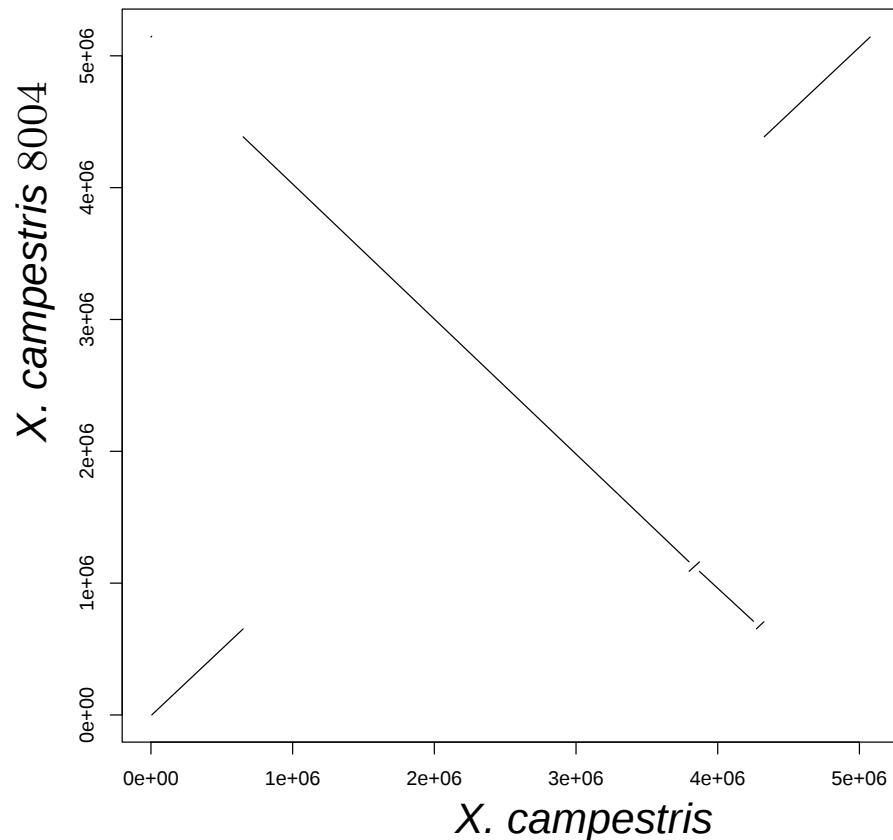
Evolution

- ❖ Example
- ❖ Mechanism
- ❖ Example (cont)
- ❖ Results

Evolution

Recontstructing ancestral genome order

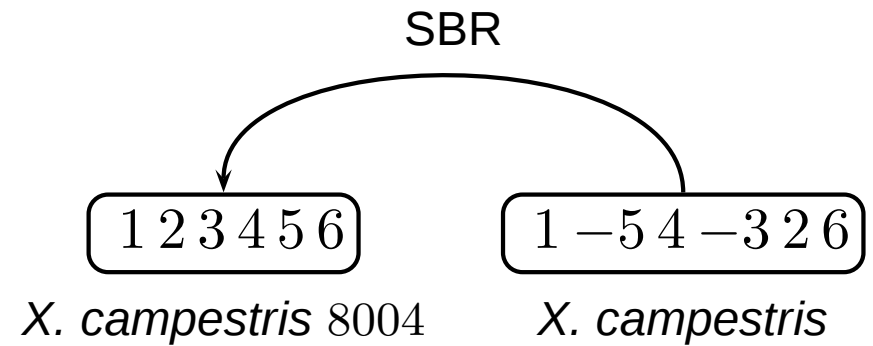
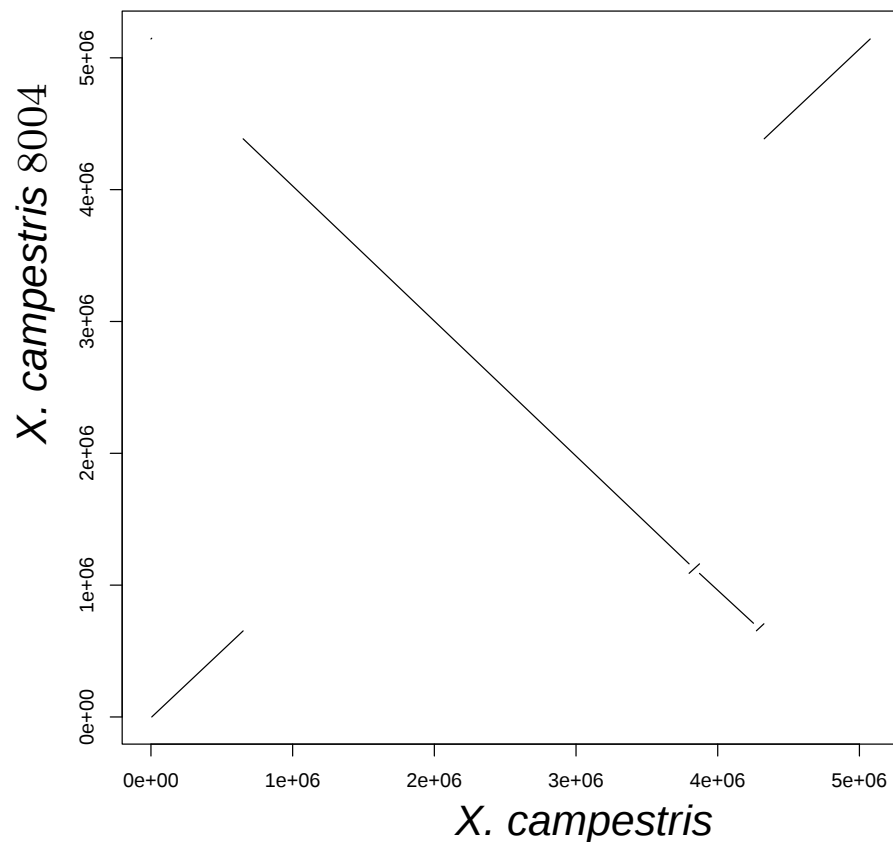
Comparing *Xanthomonas campestris* pathovar *campestris*, ATCC 33913, and 8004.



MAGIC's result [Swidan et al., PLoS CB, 2006]

Recontstructing ancestral genome order

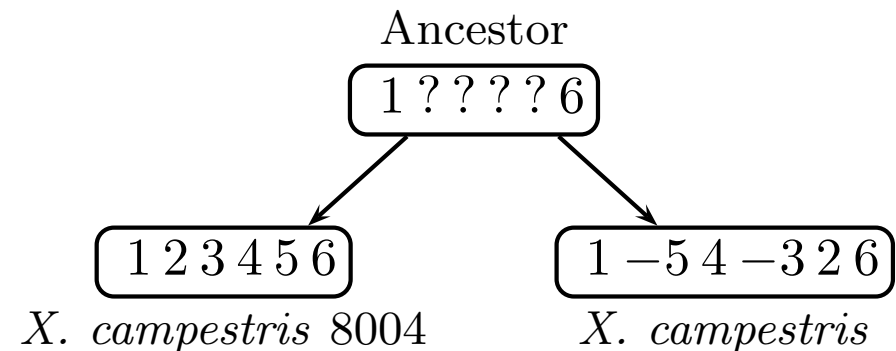
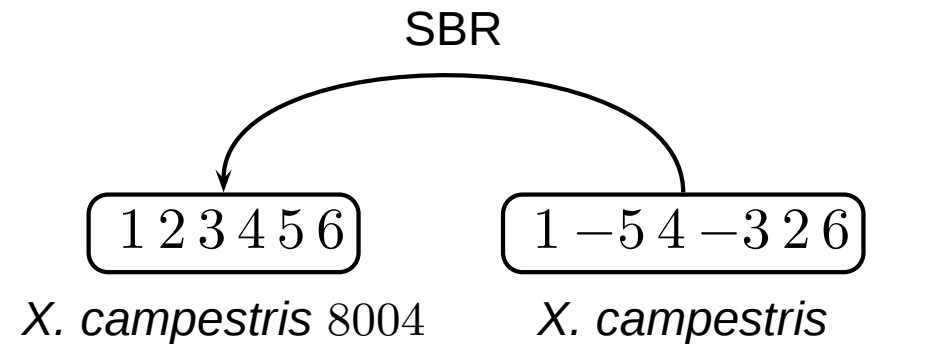
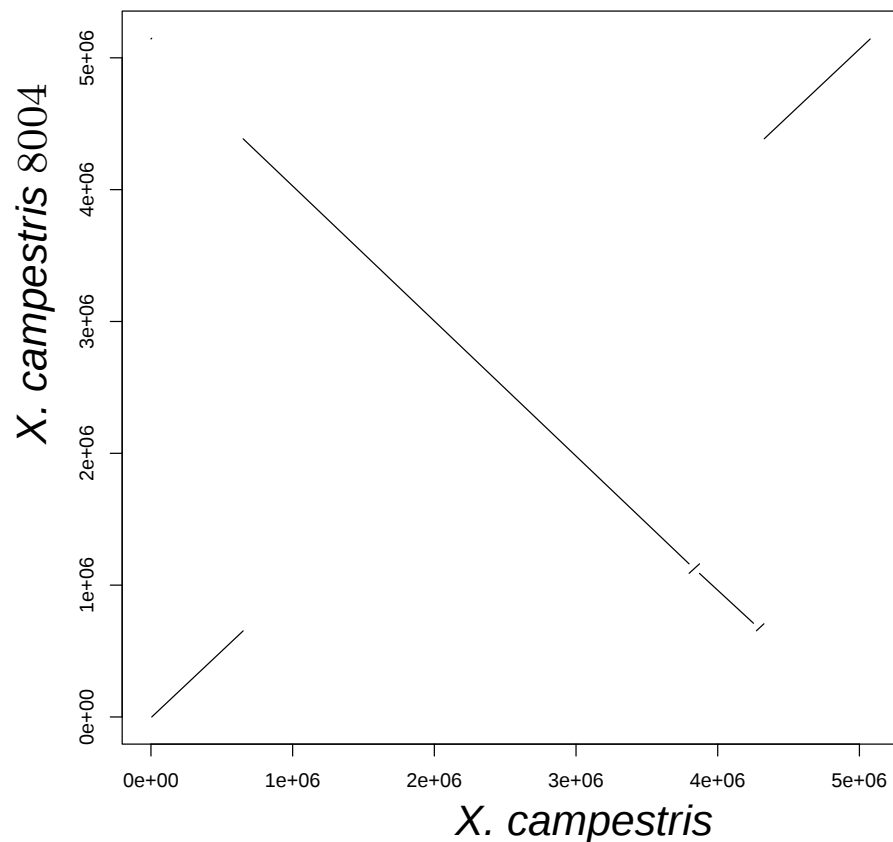
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Recontstructing ancestral genome order

Comparing *Xanthomonas campestris* pathovar *campestris*, ATCC 33913, and 8004.



MAGIC's result [Swidan et al., PLoS CB, 2006]

Mechanism

On Thieves

Evolution

❖ Example

❖ **Mechanism**

❖ Example (cont)

❖ Results

Recombinations (homologous and illegitimate) are induced by repeats [Kowalczykowski et al., 1994, Smith, 1989].

Mechanism

On Thieves

Evolution

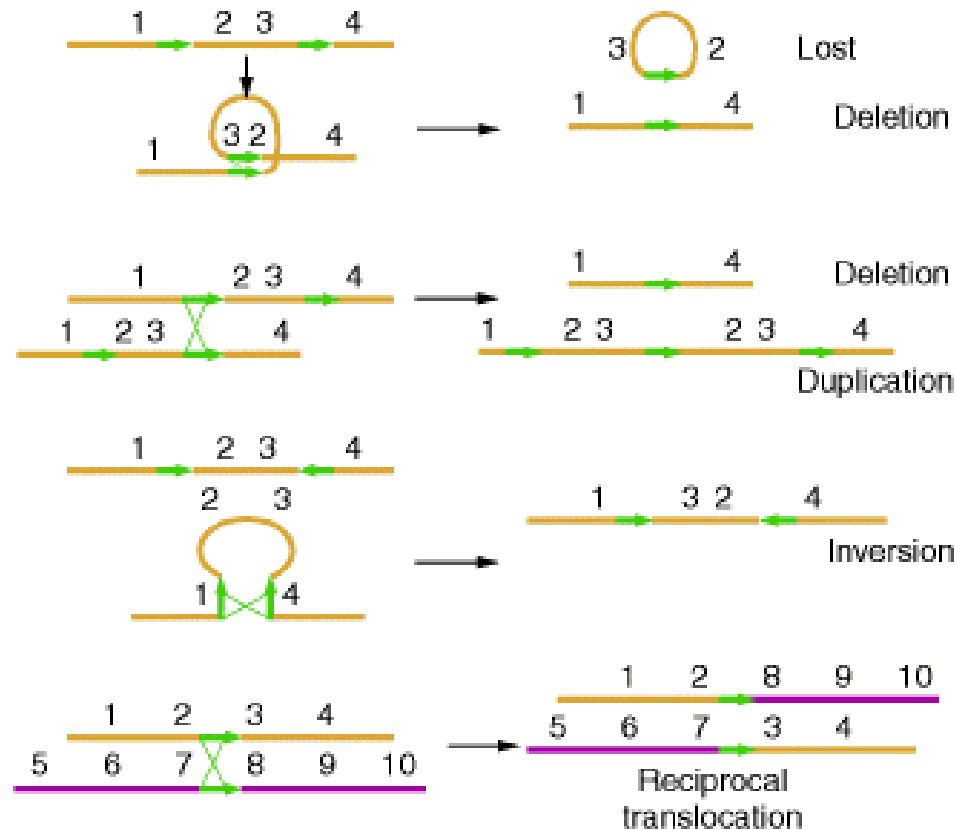
❖ Example

❖ Mechanism

❖ Example (cont)

❖ Results

Recombinations (homologous and illegitimate) are induced by repeats [Kowalczykowski et al., 1994, Smith, 1989].



Mechanism

On Thieves

Evolution

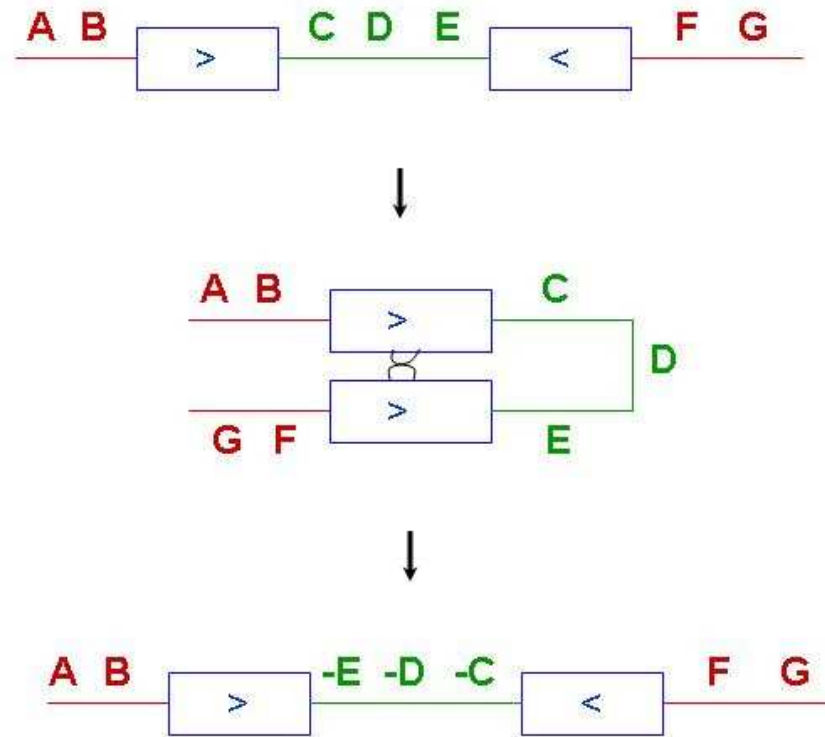
❖ Example

❖ Mechanism

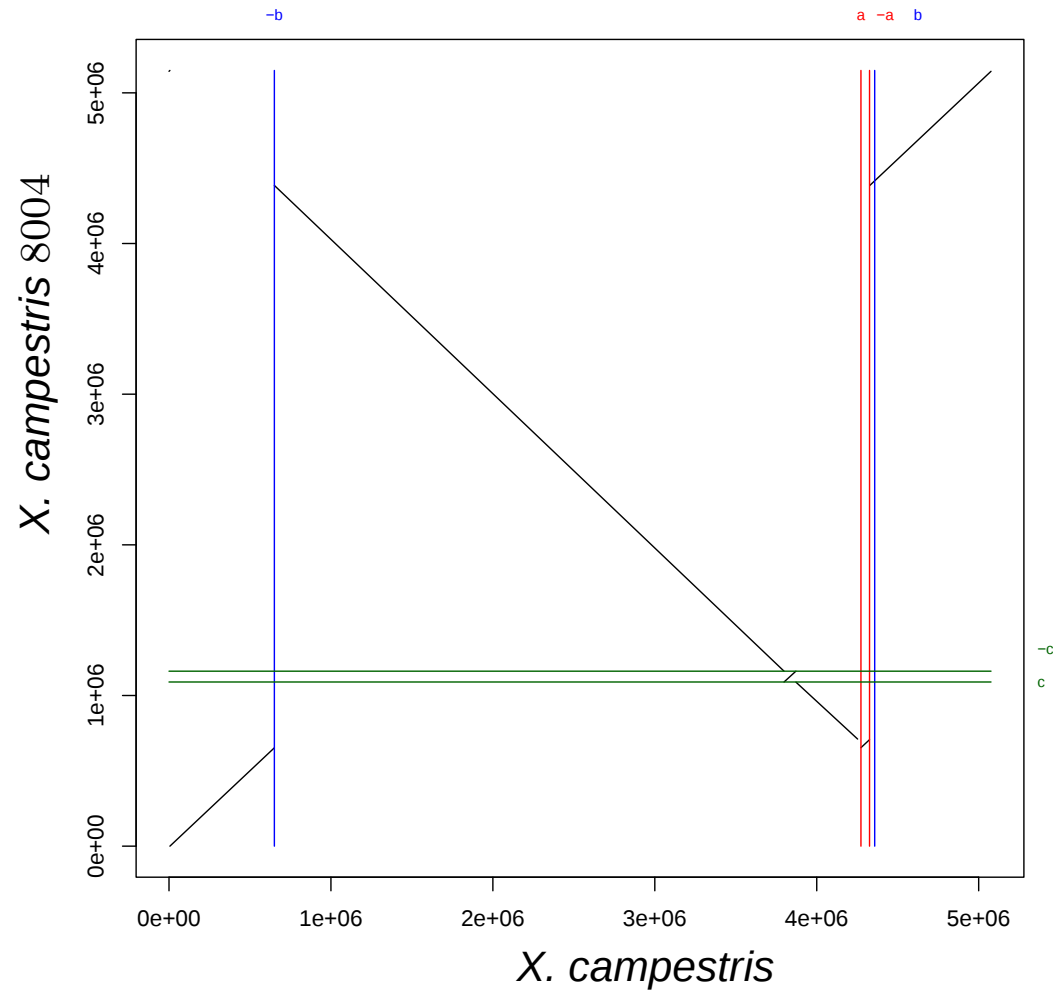
❖ Example (cont)

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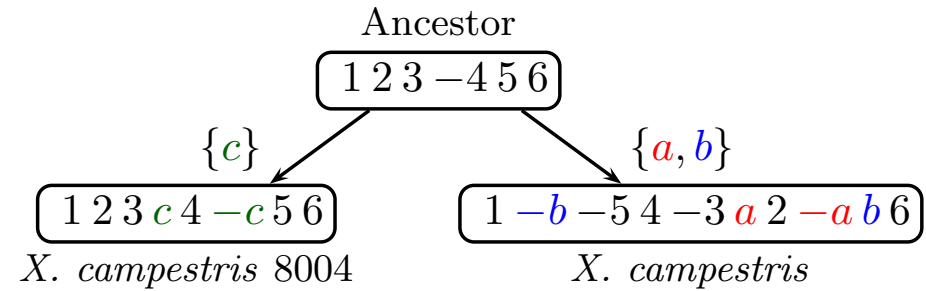
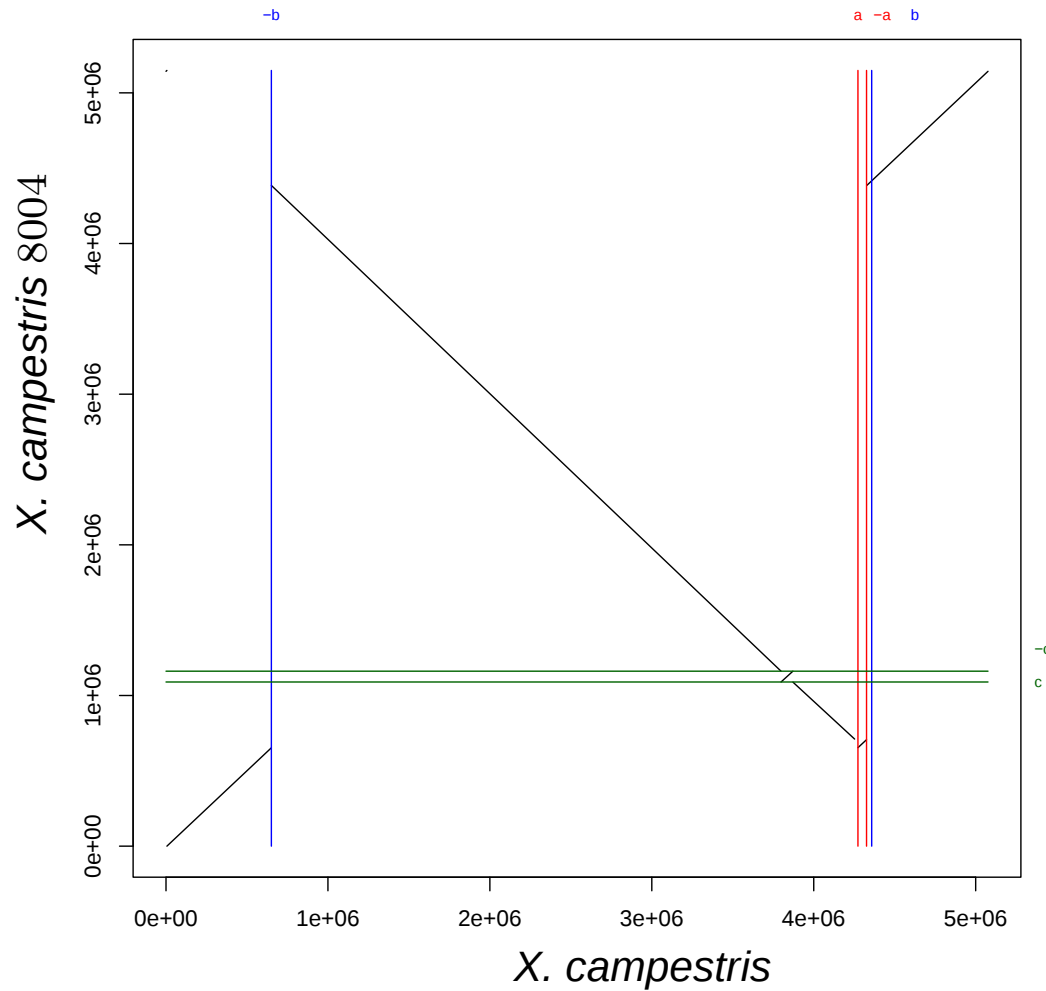


Example with repeats



MAGIC's result [Swidan et al., PLoS CB, 2006]

Example with repeats



MAGIC's result [Swidan et al., PLoS CB, 2006]

Results

On Thieves

Evolution

❖ Example

❖ Mechanism

❖ Example (cont)

❖ Results

- Single leaf case:
 - ❖ Uniqueness proof.
 - ❖ Reconstruction in linear-time complexity.
- Multiple leaf case:
 - ❖ Uniqueness proof.
 - ❖ Reconstruction in linear-time complexity.

Results

On Thieves

Evolution

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❖ Mechanism

❖ Example (cont)

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Results

On Thieves

Evolution

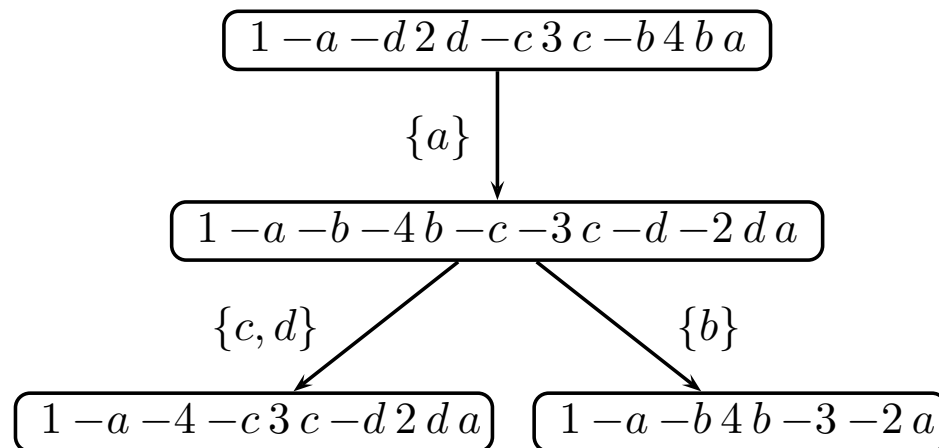
❖ Example

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❖ Example (cont)

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Results

On Thieves

Evolution

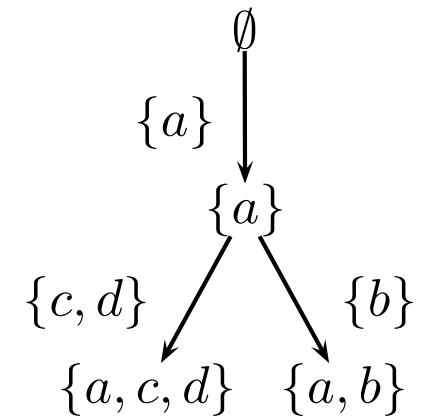
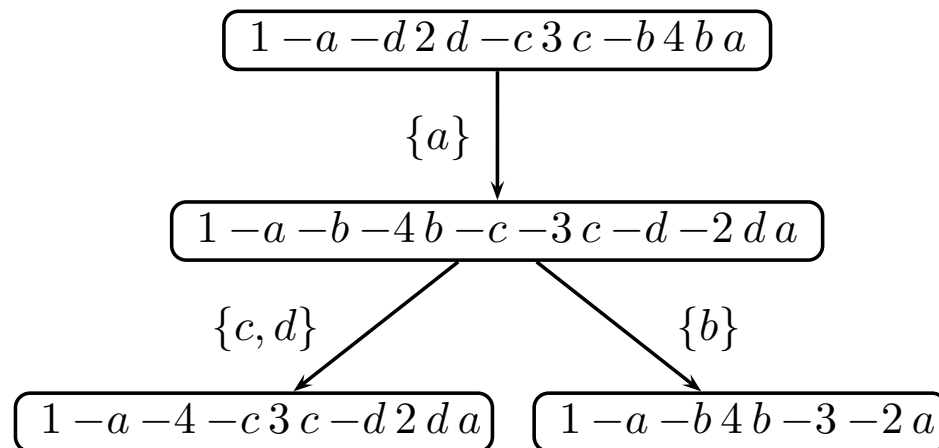
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On Thieves

Evolution

End

End