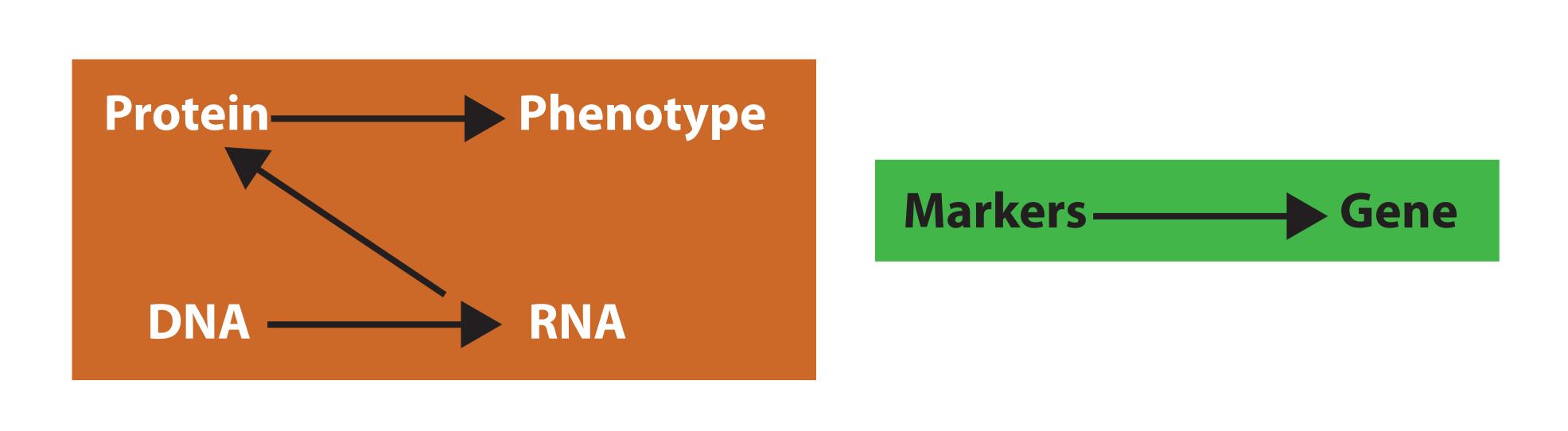
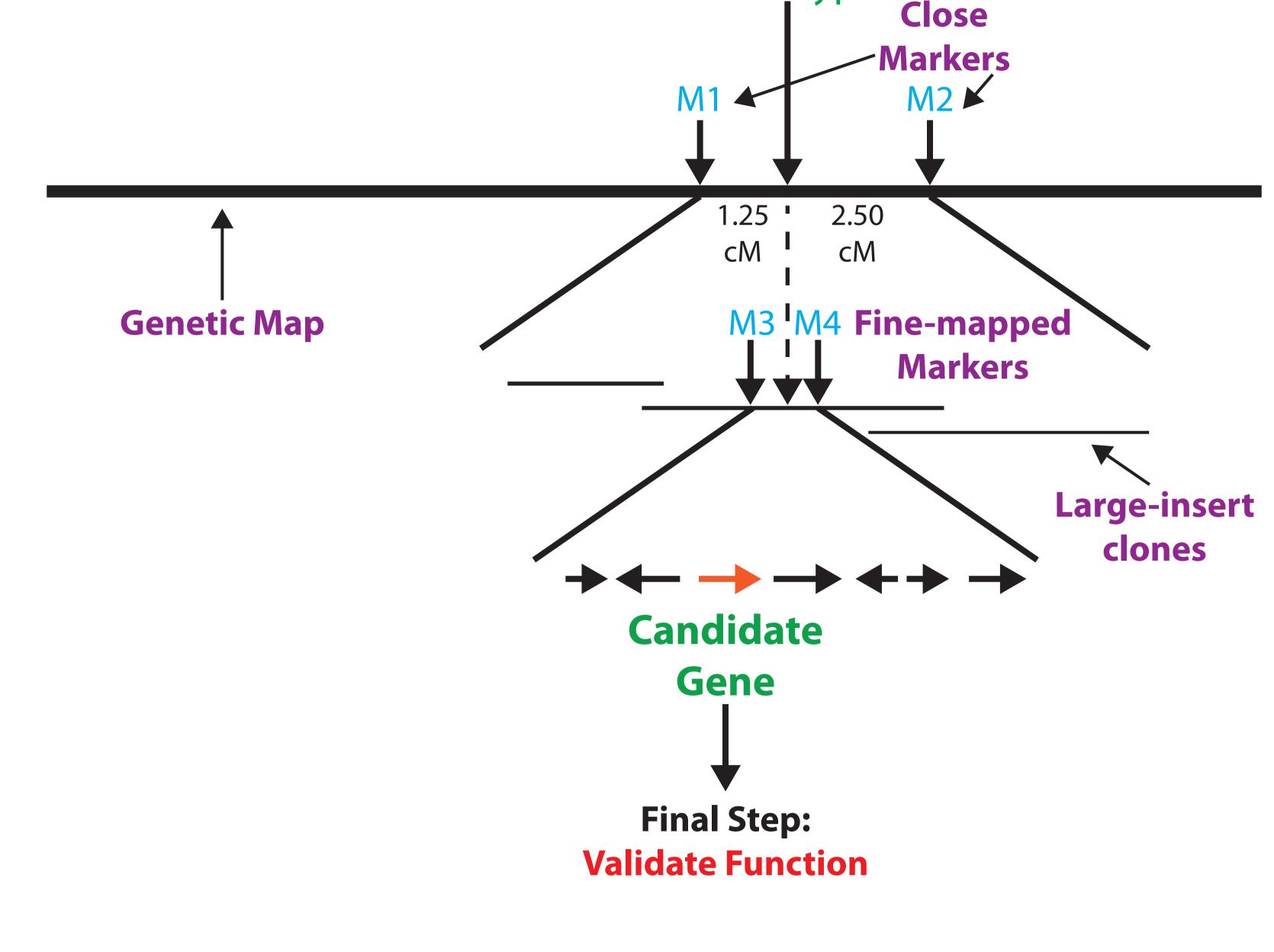
Goal of Map-Based Cloning

*Link Phenotype to Genotype *Discover gene that controls phentype



Map-based Cloning: Qualitative Trait Phenotype



Flor's Gene-for-Gene Hypothesis

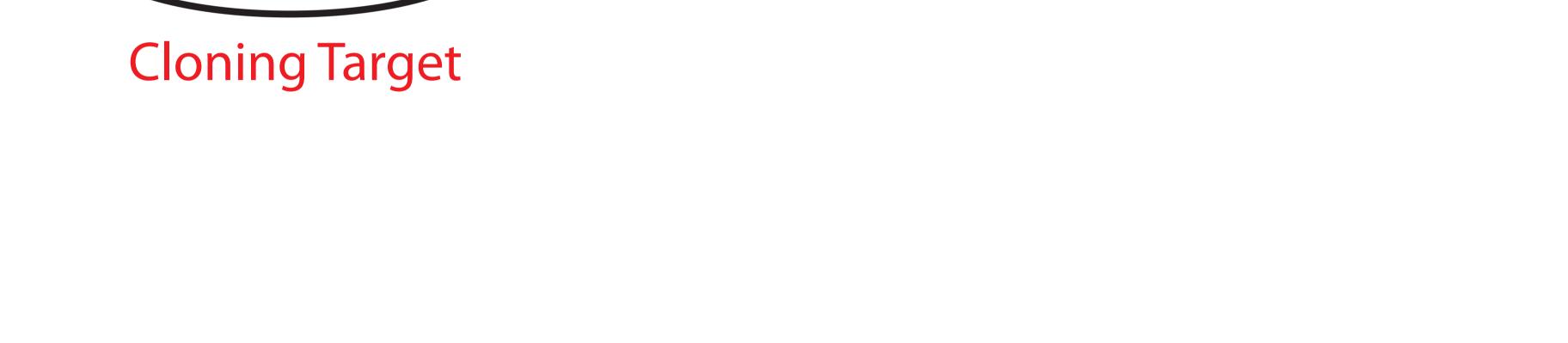
Resistance Pto gene)+

TG538-Pto

Genome Sequence

Pto

First Gene Identified by Map-based Cloning



Pathogen AvrPto effector -

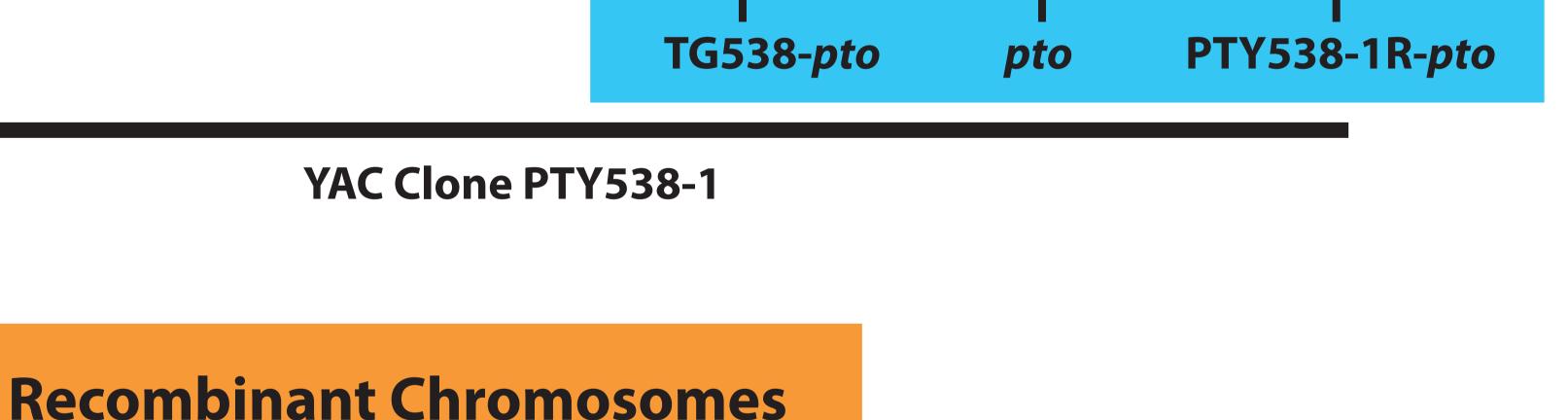
Result: Gene is located between markers

Goal: Find markers located on each side of target gene

How: Find recombination break points between markers

Recombination Mapping

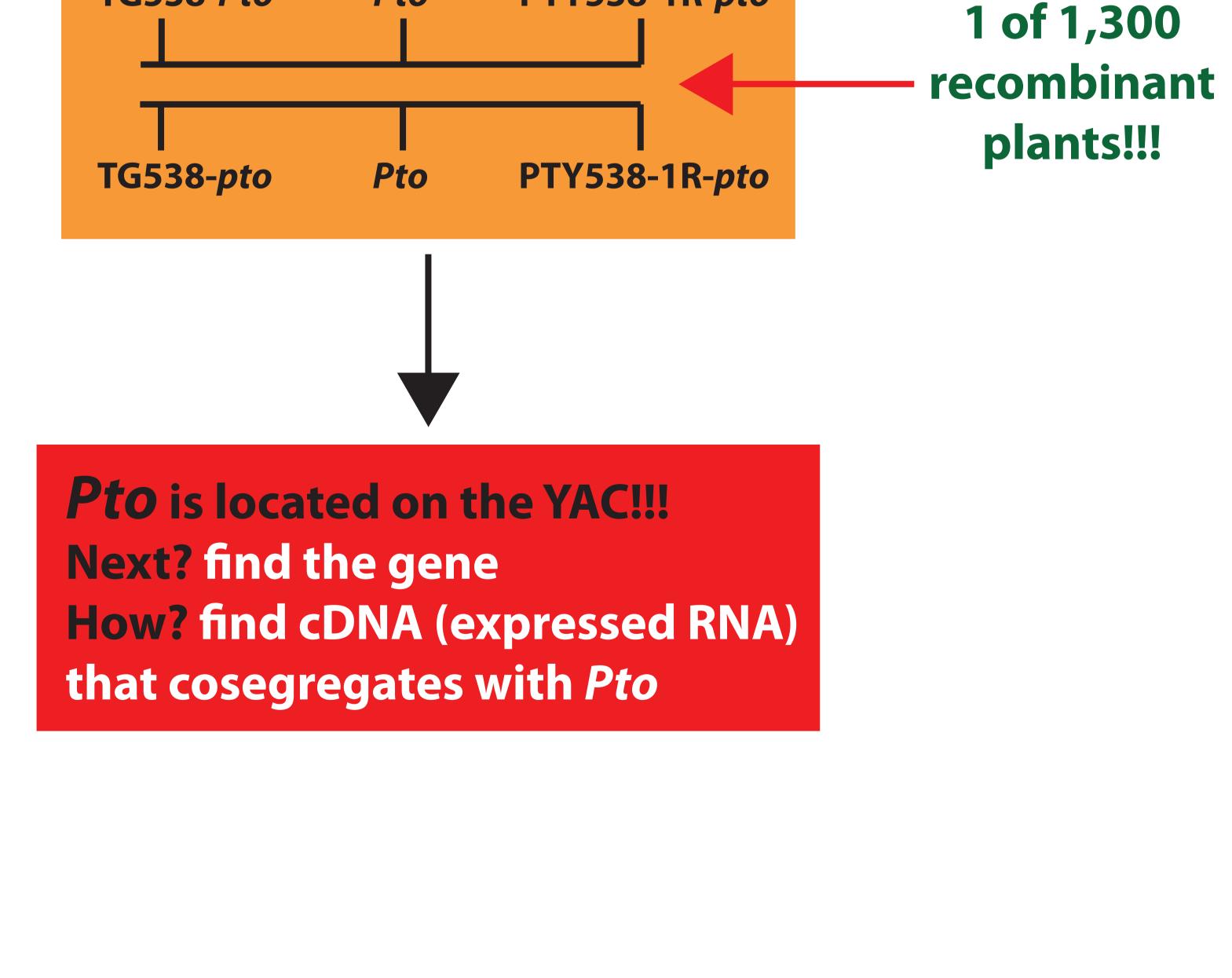
TG538-Pto Pto



Resistance

PTY538-1R-*Pto*

Pto PTY538-1R-*pto*



Genetic Complementation

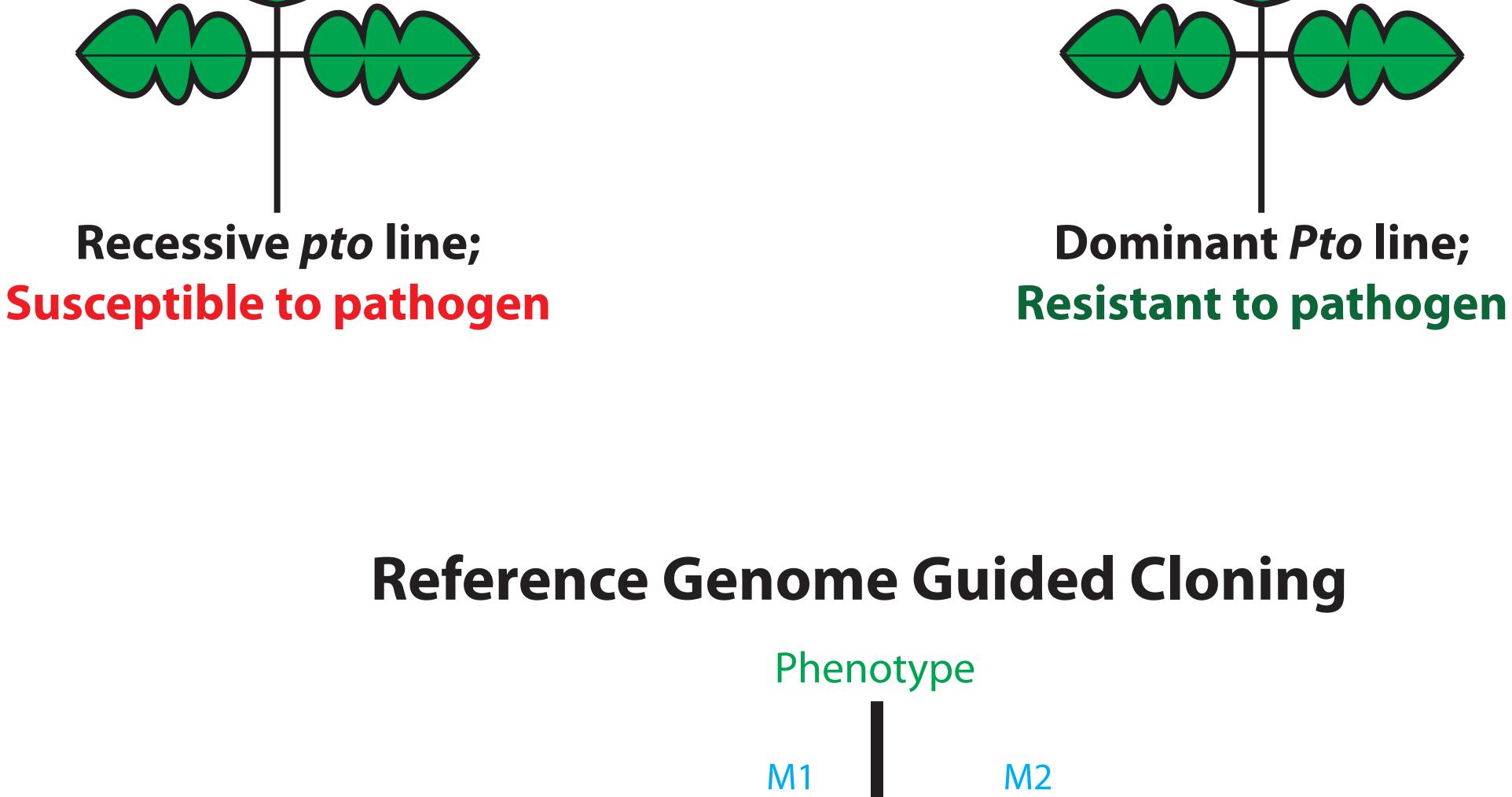
CD186

Pto

Transformation

vector with

candidate gene



Map-based Cloning: Quantitative Trait

0.25

cM

Gene Models

QTL

Result

Peak

Interval

M2

M1

Candidate

Gene

Final Step:

Validate Function

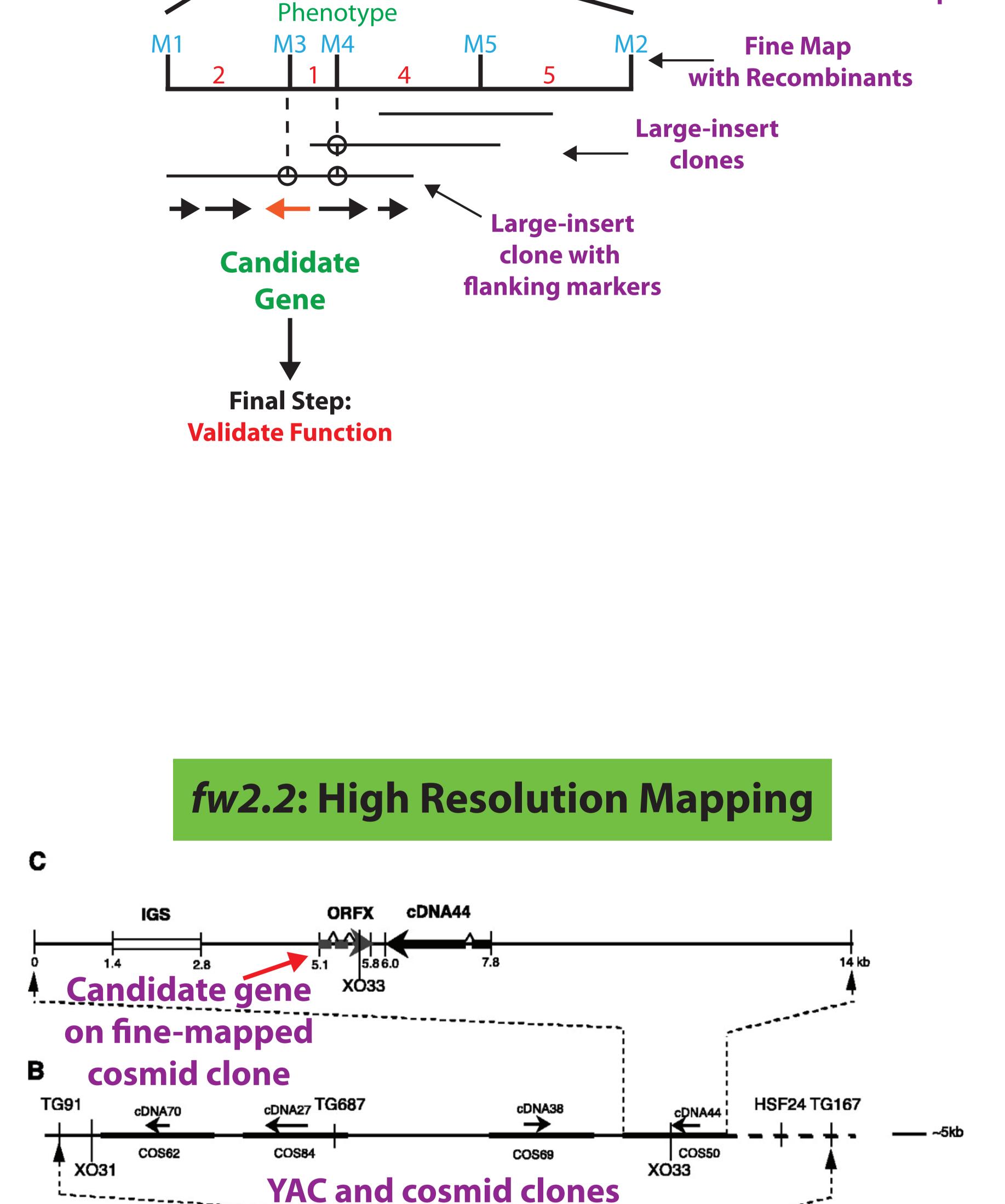
0.50

cM

Genetic Map

Dist (cM)

Marker



QTL Peak

3.3

-TG426

10.4

TG189

В

D

Original Markers

Hd1: High Resolution Mapping

