

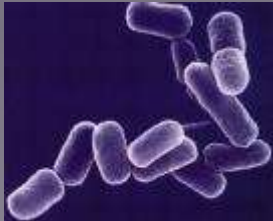
Arabidopsis thaliana Genome Project

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Why Is Arabidopsis a Model Plant?

- Relative genetic simplicity
- Convenience and abundance
- Susceptibility to T-DNA insertions
- Basic similarities to other crops



Other Model Organisms

Arabidopsis Genome Initiative

- ◎ Collaboration of U.S Department of Energy and U.S. department of Agriculture; the European Union; Government of France; and the Chiba Prefectural Government of Japan.
- ◎ August 1966 – National Science Foundation (NSF), Arlington, VA.

The tools and applications.

Arabidopsis researchers use and have developed a variety of tools, including:

- Synthetic DNA markers for mapping the genome
- Collections of useful Arabidopsis mutants
- Specialized techniques for transforming Arabidopsis genes
- Bioinformatic tools that capitalize on the latest computing and networking capabilities
- Collections of genetic maps

Timeline of major events in Arabidopsis Research

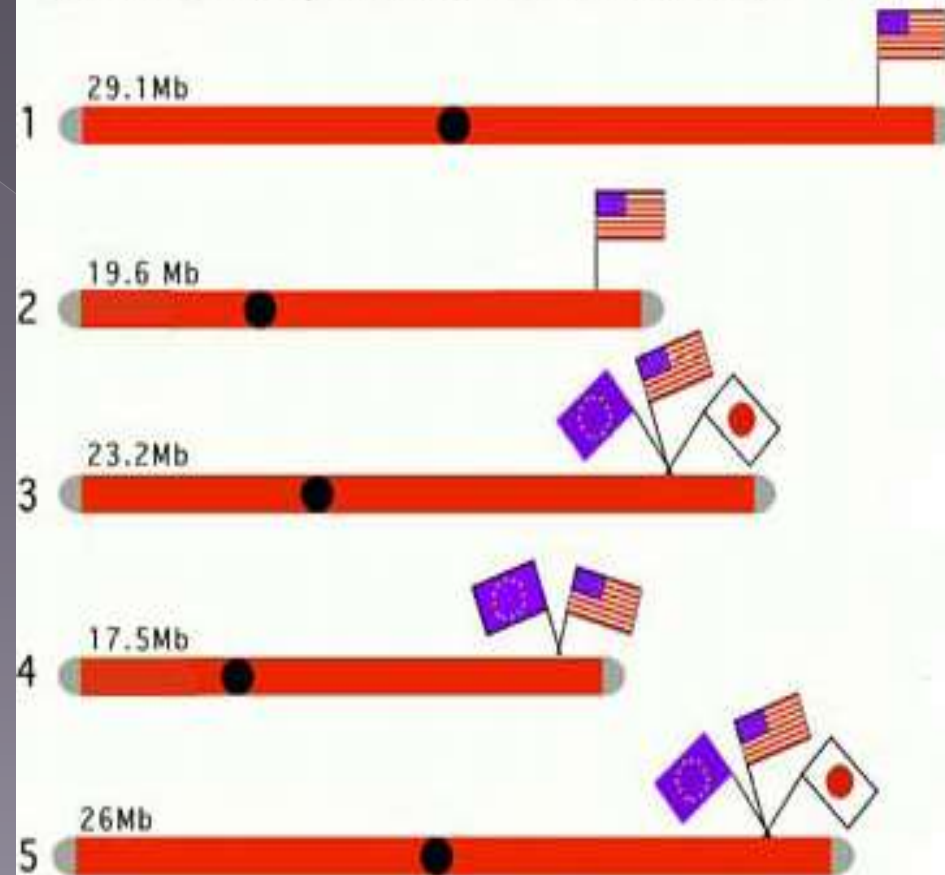
- ◎ 1964: First Arabidopsis newsletter published.
- ◎ 1965: First International Arabidopsis Conference.
- ◎ 1976: Second International Arabidopsis Conference.
- ◎ 1983: First detailed genetic map published.
- ◎ 1984: Genome size and complexity characterized
- ◎ 1985: First promoted as model for molecular genetics.

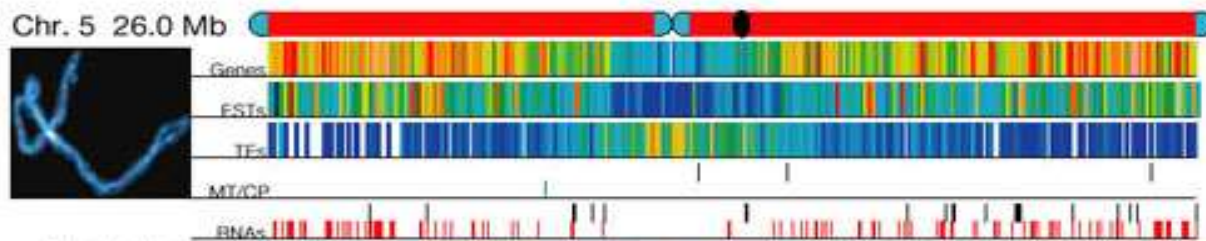
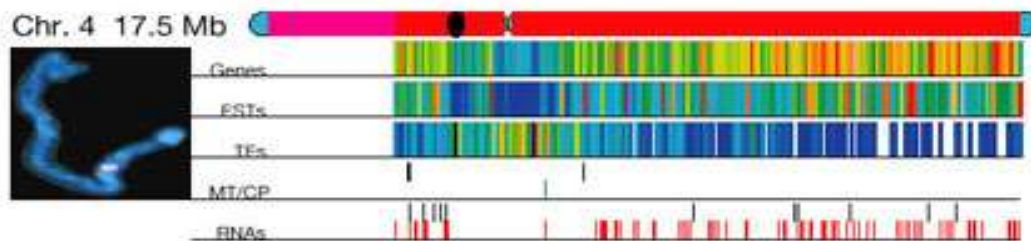
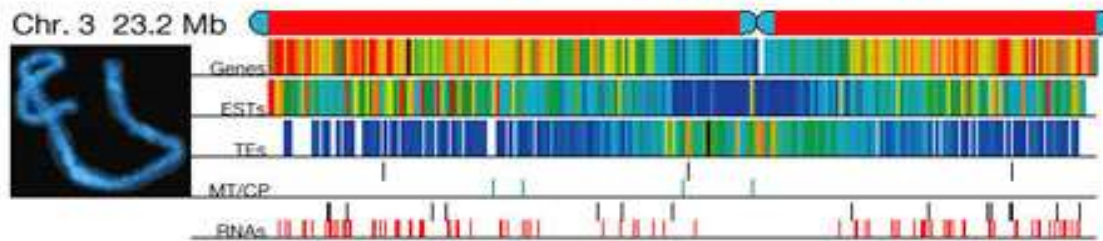
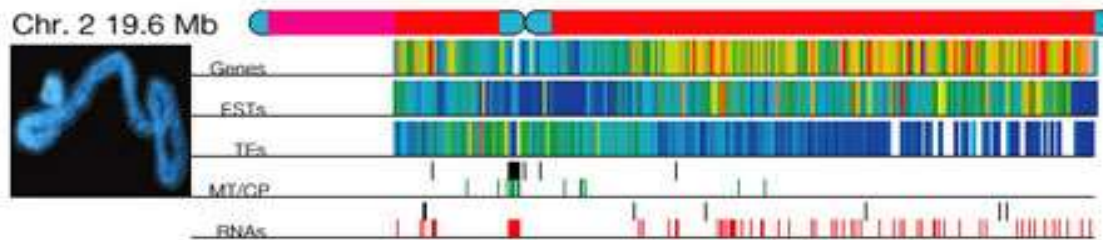
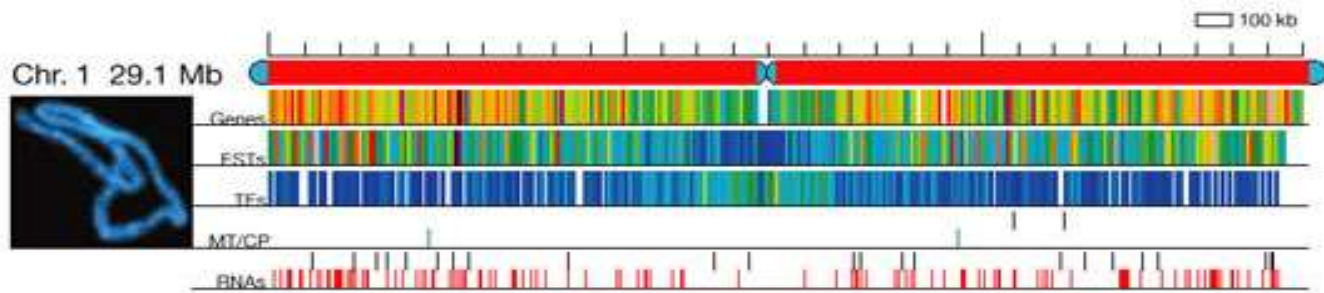
- ◎ 1986: Transformation with Agrobacterium reported
- ◎ 1986: First Arabidopsis gene sequences published.
- ◎ 1988: First RFLP chromosome map published.
- ◎ 1990: Arabidopsis Genome Project initiated .
- ◎ 1995: Standard BAC and P1 libraries constructed.
- ◎ 1996: Arabidopsis Genome Initiative organized.
- ◎ 1997: Physical maps of all chromosomes completed.
- ◎ 1999: Chromosomes II and IV sequenced
- ◎ 2000: Completion of genome sequence.

Arabidopsis Genome

- Small genome composed of approximately 25,500 genes
- 5 chromosomes
- Genome mapping project completed due to internationally coordinated program

The Arabidopsis Genome Initiative - AGI





Pseudo-colour spectra: High density Low density

Uses of Thale Cress

- studying plant sciences, including genetics, evolution, population genetics, and plant development.
- useful for genetic mapping and sequencing.
- Plant transformation studies using *Agrobacterium tumifaciens*.
- Developmental biology studies – fluo. protein markers

- ◎ study of the genetic basis of phototropism, chloroplast alignment, and stomatal aperture and other blue light-influenced processes.
- ◎ Plant pathology studies
- ◎ Disease resistance studies

Pathogen type	Example in <i>Arabidopsis thaliana</i>
Bacteria	<u><i>Pseudomonas syringae</i></u> , <u><i>Xanthomonas campestris</i></u>
Fungi	<u><i>Colletotrichum destructivum</i></u> , <u><i>Botrytis cinerea</i></u> , <u><i>Golovinomyces orontii</i></u>
Oomycete	<u><i>Hyaloperonospora arabidopsidis</i></u>
Viral	<u>Cauliflower mosaic virus (CaMV)</u> , <u>tomato mosaic virus (TMV)</u>
Nematode	<u><i>Meloidogyne incognita</i></u> , <u><i>Heterodera schachtii</i></u>

REFERENCES

- ❖ http://www.nsf.gov/news/news_summ.jsp?cntn_id=103071
- ❖ <https://www.arabidopsis.org/portals/education/aboutarabidopsis.jsp#hist>
- ❖ http://en.wikipedia.org/wiki/Arabidopsis_thaliana#Habitat.2C_morphology.2C_and_life_cycle

THANK YOU!

