

THE MULTINATIONAL COORDINATED *ARABIDOPSIS THALIANA* GENOME RESEARCH PROJECT (1990 – 2001)

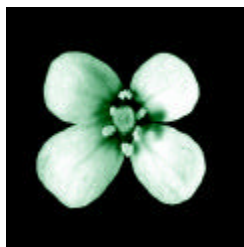
The Multinational Coordinated *Arabidopsis thaliana* Genome Research Project was launched as a cooperative international effort in 1990. At that time, a vision was put forth of a sequenced model genome and the progress that could be made using that genome as a resource in the study of plant physiology, biochemistry, growth and development. A document published in that year, entitled "A Long-range Plan for the Multinational Coordinated *Arabidopsis thaliana* Genome Project" (NSF document 90-80) put forward a set of research goals and priorities that would lead to complete knowledge of the *Arabidopsis* genome. By all accounts the project has been a great success. All the goals have been accomplished or surpassed, as summarized in the table on the following page.

International Cooperation

The Genome Project provided a platform for a whole new way of approaching scientific problems. It acknowledged from the outset that members of the *Arabidopsis* research community are all working toward the same goal; it is therefore to the advantage of all to work in a cooperative manner. By setting forth a goal of international coordination and providing for this coordination by the creation of a multinational committee (the Multinational Science Steering Committee), the Genome Project started and developed with a degree of international cooperation that had rarely been seen in the past. Indeed, the *Arabidopsis* genome sequencing project (*Arabidopsis* Genome Initiative – AGI) is widely regarded as a positive example of the progress that can be made when a research community works together to achieve a goal.

Looking back on the project thus far, it is clear that it is this spirit of cooperation that has allowed its success. As genome research enters the next phase of functional genomic research, we must take with us the lessons of the first ten years: international cooperation, coordination of efforts, and communication among the involved groups are essential. By minimizing duplication of effort, removing obstacles for sharing of data and biological resources, and emphasizing the clear realization that all groups are working toward the same goal, we can foster a spirit of cooperation that will well serve the community, and eventually the world.





1990 GOALS	2001 PROGRESS
Analysis of the <i>Arabidopsis</i> genome	
Saturation mutagenesis and development of facile methods for transposon tagging to define as many genes as possible	Over 500,000 lines of chemically-induced and insertion mutants created and made available to research community
Creation of cDNA and EST libraries representing different tissues and cell types	Over 150,000 ESTs in GenBank; cDNA libraries readily available and several full length cDNA sequencing projects underway world-wide
Integration of physical and genetic maps	Recombinant Inbred map made available in 1993, used to construct YAC, BAC, and P1 physical maps by 1997
Mapping of centromeres	Completed by tetrad analysis in 1998
Sequence the entire genome	Completion of <i>Arabidopsis</i> genome sequence, December 2000
Development of Technologies for Plant Genome Studies	
New transformation technologies	Vacuum infiltration and Floral dip technologies, coupled with new-generation transformation plasmids (<i>Agrobacterium</i> T-DNA derivatives) make plant transformation easy and efficient
Un-anticipated goal	Expression analysis tools such as DNA chips, microarrays and yeast two hybrid systems became available
Establishment of Biological Resource Centers	
Establish two centers to serve the world-community of <i>Arabidopsis</i> researchers	NASC (http://arabidopsis.org.uk/), ABRC (http://www.arabidopsis.org/abrc/index.html), established in 1991 and together handled over 90,000 orders in 2000
Information Sharing and Databases	
Development of an informatics program to facilitate exchange of research results	TAIR (http://www.arabidopsis.org), AGR (http://ukcrop.net/agr/), Newsgroups (UK based: Arabuk@lists.bbsrc.ac.uk; US based: arab-gen@net.bio.net)
Development of Human Resources	
Support postdoctoral fellowships for <i>Arabidopsis</i> research	Numerous postdoctoral fellows were trained worldwide under various <i>Arabidopsis</i> research programs. Young scientists dominate the <i>Arabidopsis</i> biology field, indicating successful efforts in human resource development
Support short-term scientist exchanges and short courses for training in <i>Arabidopsis</i> research techniques	Annual <i>Arabidopsis</i> Molecular Biology Course held at Cold Spring Harbor Laboratory
Workshops and Symposia	
Support workshops and symposia to disseminate the results of <i>Arabidopsis</i> research	Establishment and support of an annual International Conference on <i>Arabidopsis</i> Research

