

MASC Presentation at the 2nd Workshop of the International Steering Committee on Plant Genomics

- Presented by Philip Benfey, past MASC chair (2005-2006) (Duke University)
- Developed by Joanna Friesner (MASC Coordinator, University of California, Davis)
- In a parallel session to the **6th PlantGEMS annual meeting (Oct. 3-6, 2007; Tenerife, Canary Islands, Spain)**



Multinational Science Steering Committee: established 1990

- NSF-sponsored workshops in 1990 brought together an international community of scientists to develop Arabidopsis as the **model system** for flowering plants
- An ad hoc committee of 9 volunteer Arabidopsis scientists was formed: the Multinational Arabidopsis Science Committee (MSSC)
- Members represented: USA, UK, EU, Japan, and Australia
- **The overarching goal of the MSSC:** to guide the Arabidopsis Genome Research Project whose mission was to **determine the complete Arabidopsis genome sequence by the year 2000**



Arabidopsis Genome Research Project- 1990-2000

Primary underlying principles:

- ▣ A **profound understanding of plant biology** is needed for current and future global challenges
- ▣ The use of an **experimental model system** is extremely effective in studying biology
- ▣ **Arabidopsis** is a useful model for flowering plants
- ▣ **International coordination is necessary** for rapid and efficient advances in Arabidopsis genome research
- ▣ The MSSC was created to **ensure free exchange** of ideas and information to advance the field as a whole and **minimize duplication of effort**



Arabidopsis Genome Research Project- 1990-2000

Specific Objectives:

- ❑ **Genome analysis:** production of mutants; determine physical map of the genome; develop cDNA libraries; ultimately: sequence the entire genome
- ❑ **Develop technologies** for plant genome studies
- ❑ **Establish at least 2 biological resource centers** for depositing and distributing seed and DNA resources
- ❑ **Develop informatics:** data collection, management, distribution and analysis
- ❑ **Develop human resources:** train scientists well-versed in plant biology and genomics technologies
- ❑ **Support Arabidopsis workshops and conferences,** both broad and focused



The Multinational Arabidopsis Steering Committee: established 2002

- ❑ **Impetus for initiation:** completion of the Arabidopsis genome sequence in December, 2000
- ❑ **Charged with:** guiding the newly developed Multinational Coordinated Arabidopsis thaliana Functional Genomics Project and ensuring a high level of international cooperation and coordination of efforts
- ❑ **Goal of the Functional Genomics Project:** use Arabidopsis as an experimental model system to expand knowledge of plant biology to allow improvement of economically important plants
- ❑ **Project Mission:** to determine a function of every Arabidopsis gene by the year 2010



Initial MASC members (2002)

- Mike Sussman (Co-chair, USA)
- Thomas Altmann (Co-chair, Germany)
- Bill Crosby (Canada)
- Ian Furner (UK)
- Mary Lou Guerinot (USA)
- Gerd Jurgens (Germany)
- Ottoline Leyser (UK)
- Jiayang Li (China)
- Keith Lindsey (UK)
- Sean May (UK)
- Peter McCourt (Canada)
- Fernando Migliaccio (Italy)
- Javier Paz-Ares (Spain)
- Kazuo Shinozaki (Japan)
- Ian Small (France)
- Geoff Wasteneys (Australia)
- ZhangCai Yan (China)
- Marc Zabeau (EPSO)



Responsibilities of the MASC

- ❑ coordinate programmatic aspects of Arabidopsis research worldwide
- ❑ facilitate open communication and free exchange of resources, ideas and information among the Arabidopsis research community
- ❑ monitor and summarize progress of participating laboratories
- ❑ identify needs and opportunities of the research community and communicate them to funding agencies
- ❑ periodically update and adjust the course of the project



MASC Goals

Short-term (in 2002):

- Appoint a full-time MASC Coordinator
- Publish a long-range plan for the Multinational Arabidopsis Functional Genomics Project
- Establish and maintain a functional genomics internet site to promote communication in the world-wide community

On-going:

- Continue to foster international collaboration and coordination
- Continue to monitor progress and periodically reassess the status of the project
- Adjust project goals as needed
- Publish periodic reports



Scientific Objectives of the Functional Genomics Project (initiated in 2002)

- ❑ **Develop an expanded genetic toolkit** including comprehensive sets of sequenced plant mutants; whole genome mapping procedures; conditional expression systems; development of RILs; libraries of transgenic lines for overexpression or repression
- ❑ **Whole-systems identification of gene function** including global analysis of (1) gene expression, (2) the plant proteome, (3) metabolite dynamics, (4) catalogs of molecular interactions, and (5) comparative genomics



Scientific Objectives of the Functional Genomics Project (continued)

- ❑ **Expand role for bioinformatics** including development of tools such as cellular and whole plant visualization tools, and databases where information is stored and extracted
- ❑ **Develop community and human resources** by establishing centers that provide services and tools, supporting technology development; establishing summer courses and other training workshops; encouraging interdisciplinary training; and supporting postdoctoral fellowships with a focus on exchange visits
- ❑ **International cooperation** to allow functional genomics to rapidly progress.

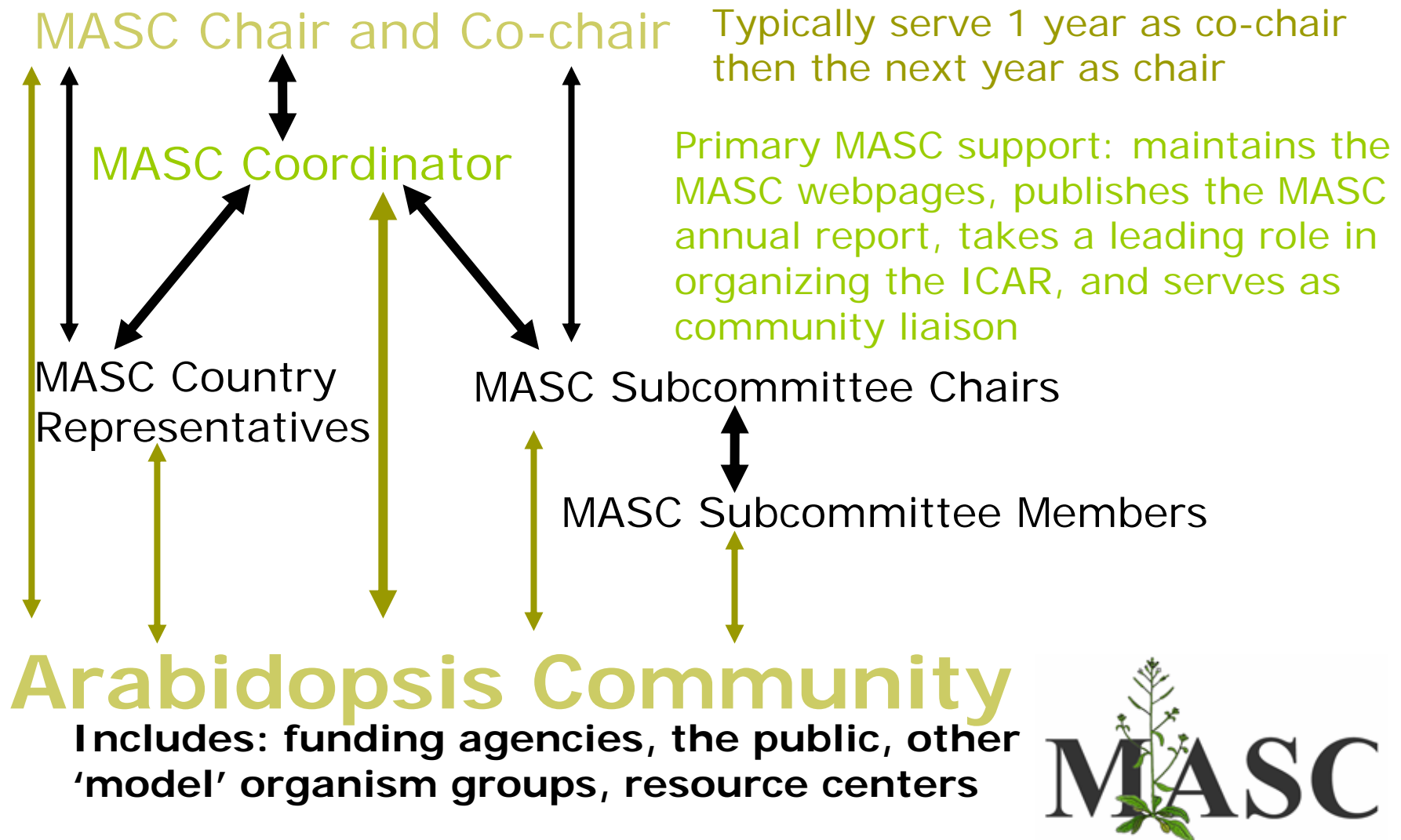


MASC- Funding

- ❑ No direct funding of MASC (except via the MASC Coordinator)
- ❑ Since 2002, the NSF has primarily funded the MASC Coordinator position (Germany funded for 1 year)
- ❑ Current Coordinator funding ends in March, 2009
- ❑ MASC members (chair, co-chair, country representatives, subcommittee members) all serve voluntarily
- ❑ Annual MASC meetings are held during the ICAR
- ❑ Lack of funding requires MASC meeting to be optional (although attendance is fairly good)



MASC Management Structure



Future Plans

- ❑ 2010 is the projected end of the Functional Genomics Project
- ❑ It is also the end of the AT2010 project (U.S.)
- ❑ MASC began a dialog at the 18th ICAR (June, 2007) on the 'next phase' for Arabidopsis research
- ❑ Challenges- while many of the goals of the Functional Genomics Project were met, many were not
- ❑ There is still much to be learned about Arabidopsis and much to be translated to crops



Future Plans- continued

- New goals- that encompass evolving technology and redefined issues- must be established
- For example- systems biology, bioinformatics and 'data overload', development of new technologies, exploitation of natural variation, translation of knowledge to economically-important species
- '2020 vision' workshops proposed for early 2008 (U.S. and Europe) followed by further discussion at the MASC annual meeting during ICAR 2008- Montreal, Canada

