

Genetic stocks – Maize / Millets

Category	Tropical Maize	Millet	Small millet
Bi-parental pop. (RIL - F2 - F3)	X	X	Gap
Advanced BC pops	X	Gap	Gap
Recurrent pop	X	X	??
Breeding / Tester lines	X	X	??
Introgression / Substitution lines	Gap	WIP	Gap
Multiparental pops	Gap	Gap	Gap
Advanced Intercrossed pops	Gap	Gap	Gap
Assoc Map panels (incl. nested)	X	Gap	Gap
Wild crosses	??	Gap	??
Tilling pops	Gap	X	Gap
Mutant / "Gene machine"	Gap	Gap	Gap
Transgenics	Gap	Gap	Gap

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Complex vs simple traits. Agreed to have populations for complex traits, as these may work across complex traits

Private sector: How can it help? “private sector” brainstorming session.

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Multiparental lines: Ok for breeding
Less for gene discovery (except prediction of breeding values of allele combinations)

Introgression lines: More affordable than substitution lines
10-25% of exotic source, characterized per segment or not
Tropical into temperate
Pioneer may help with Temperate into tropical (BC2)

Introgression vs multiparental : Both needed
Debate - Peter's Landridge talk.

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Association mapping panel: Reviewing/refining current

See whether any diversity missing

See whether too wide phenology for phenotypic use

Inbreds: Generate inbred or double haploids from landraces in maize

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Mutant/tilling populations: Little interest for complex trait.
Little demand to create these tools

Transgenics: No clear need
May be good for trait confirmation/investigation –
Concern about maize and millet being open pollinated.

Feedback from Brainstorming Session II: Research bottlenecks for Crop Improvement (combined maize, millet, and sorghum)

**Facilitated by Vincent Vadez and Tom Hash,
note taken and reported by Marilyn Warburton**

Saturday, September 15, 2007 2 – 4 pm

For all crops:

Bottleneck	Demand	What can GCP offer?	What training is needed?
Marker availability	Common set of markers between labs	Suggest common set Info. on what markers available	
Precision phenotyping	Improved, characterized sites for genotype testing for NARs Precision phenotyping sites for gene discovery Specific trait/protocols	Site characterization Capacity building of NARs sites	
IT	Physical capacity, internet connectivity, stable power, lacking in NARs	print CDs and DVDs of databases, tools, lectures, etc	How to search databases

For all crops (continued):

Bottleneck	Demand	What can GCP offer?	What training is needed?
Characterization of the reference set	Phenology! Range of variation needed?	\$ for phenotyping Distribute seeds of reference set Maintain phenotypic data	
Expertise	lacking in some regions for some aspects of research Some labs cannot run markers; few can run physiological traits	Provide GSS Link to programs such as AGRA and PASS	Fund PhD degrees?
Constituted teams	Is the entire research and delivery team in place?	Gap analysis of “product delivery pipeline and team” for each crop/region	

For all crops (continued):

Bottleneck	Demand	What can GCP offer?	What training is needed?
Cost of technologies	Must be cheaper to run smaller numbers of SNPs Capital for genotyping costly! Phenotyping improves with \$	may be able to gain efficiencies of scale if central genotyping can be done; not possible for phenotyping	
Facilities	access to drought screening fields, for gene discovery and for genotype testing	SP5 to help build physical capacity for field phenotyping for drought	

Specifically for the small millets:

Bottleneck	Demand	What can GCP offer?	What training is needed?
Marker availability	no markers, sometimes can use pearl millet markers	marker discovery in finger millet (SNPs, SSRs, or DArT?)	
Expertise	Not much drought physiology work done		
Constituted teams	User community not ready for markers Too low critical mass		training of millet breeders on integration of MAS into breeding programs

Specifically for pearl millet:

Bottleneck	Demand	What can GCP offer?	What training is needed?
Marker availability	Would like DArTs	Create DArT array for pearl millet	
Expertise	Gaps in drought physiology and traits		
Constituted teams	Too low critical mass		

Specifically for sorghum:

Bottleneck	Demand	What can GCP offer?	What training is needed?
Constituted teams	too low critical mass		