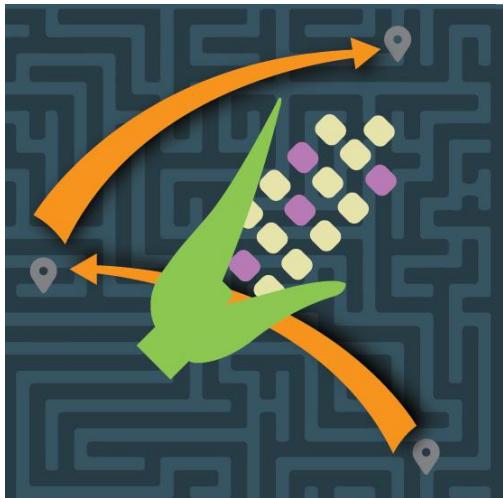


The Maize Molecular Atlas

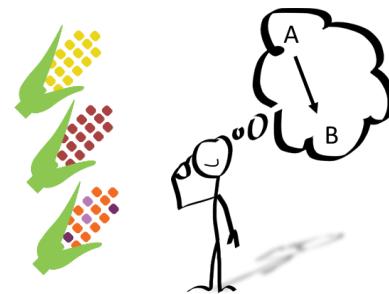
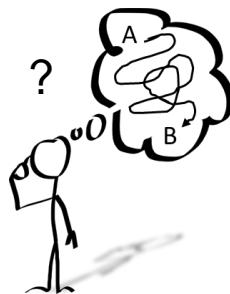
A valuable resource for the world

What is the maize molecular atlas?

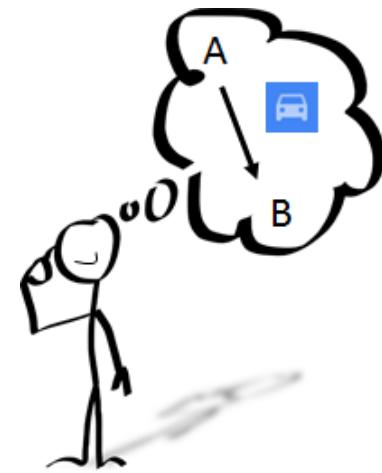
- Resource base to explore maize genetic diversity and guide decision making



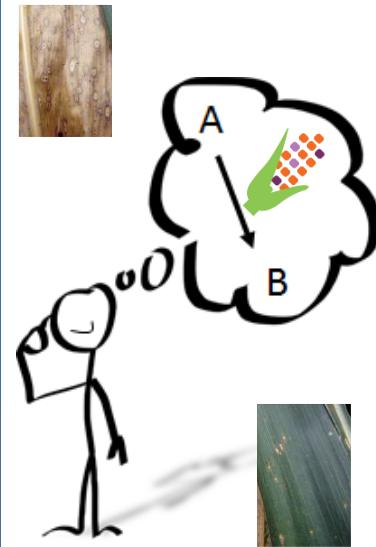
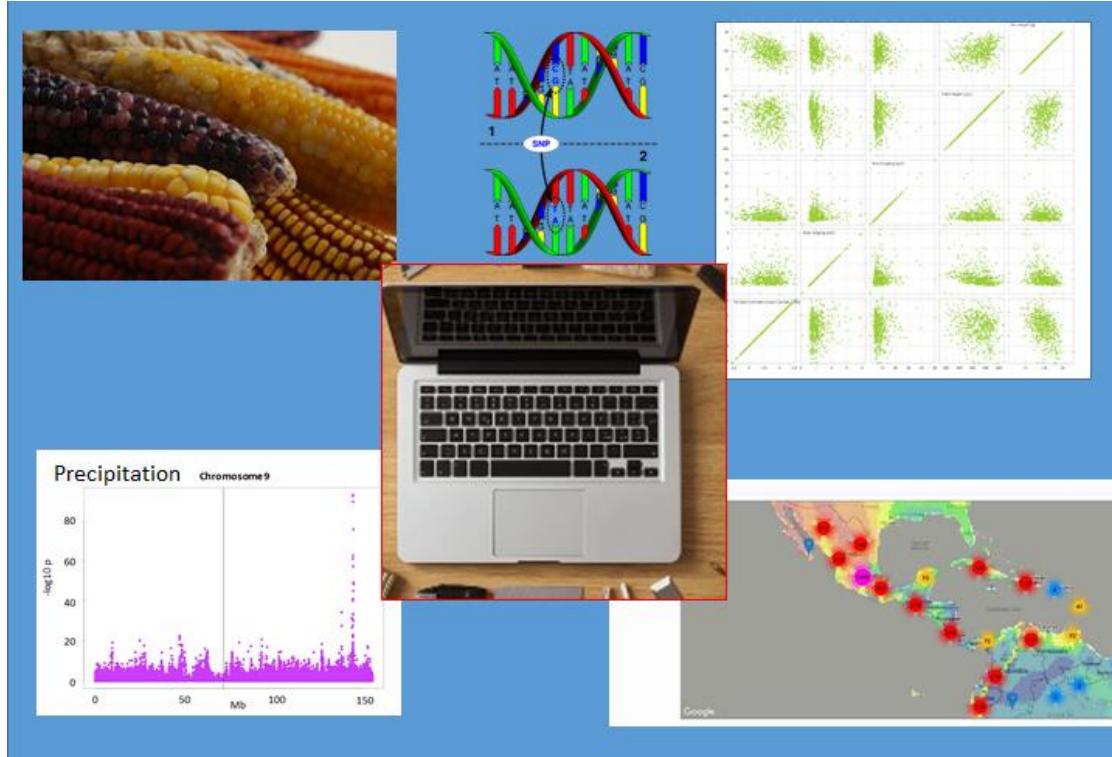
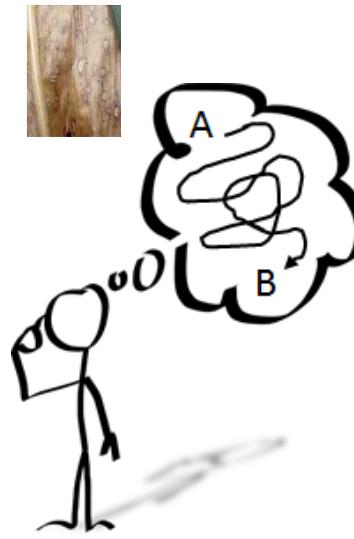
Why do we need it?



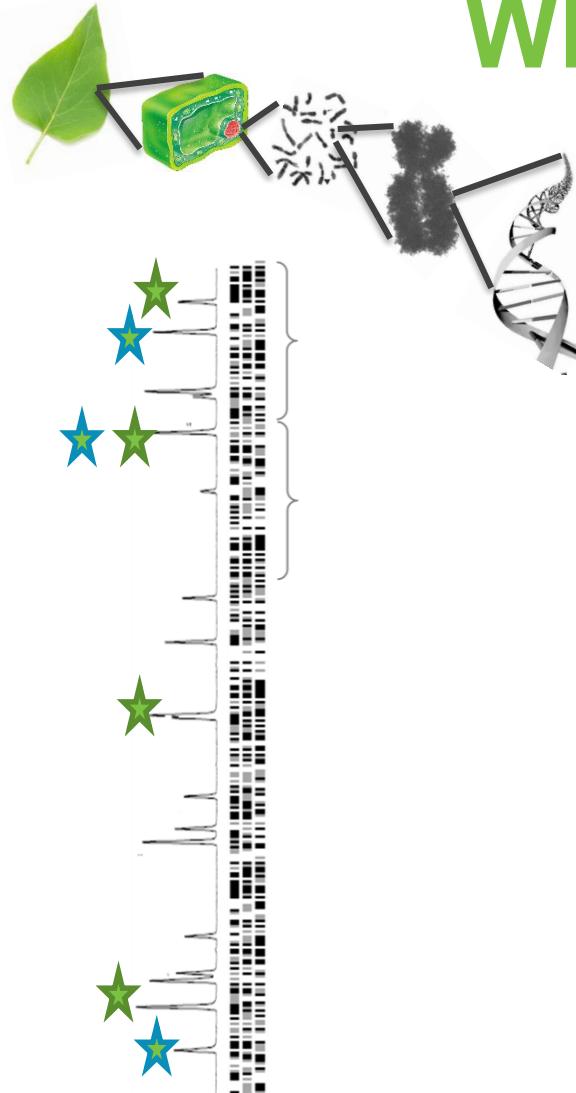
Why an atlas?



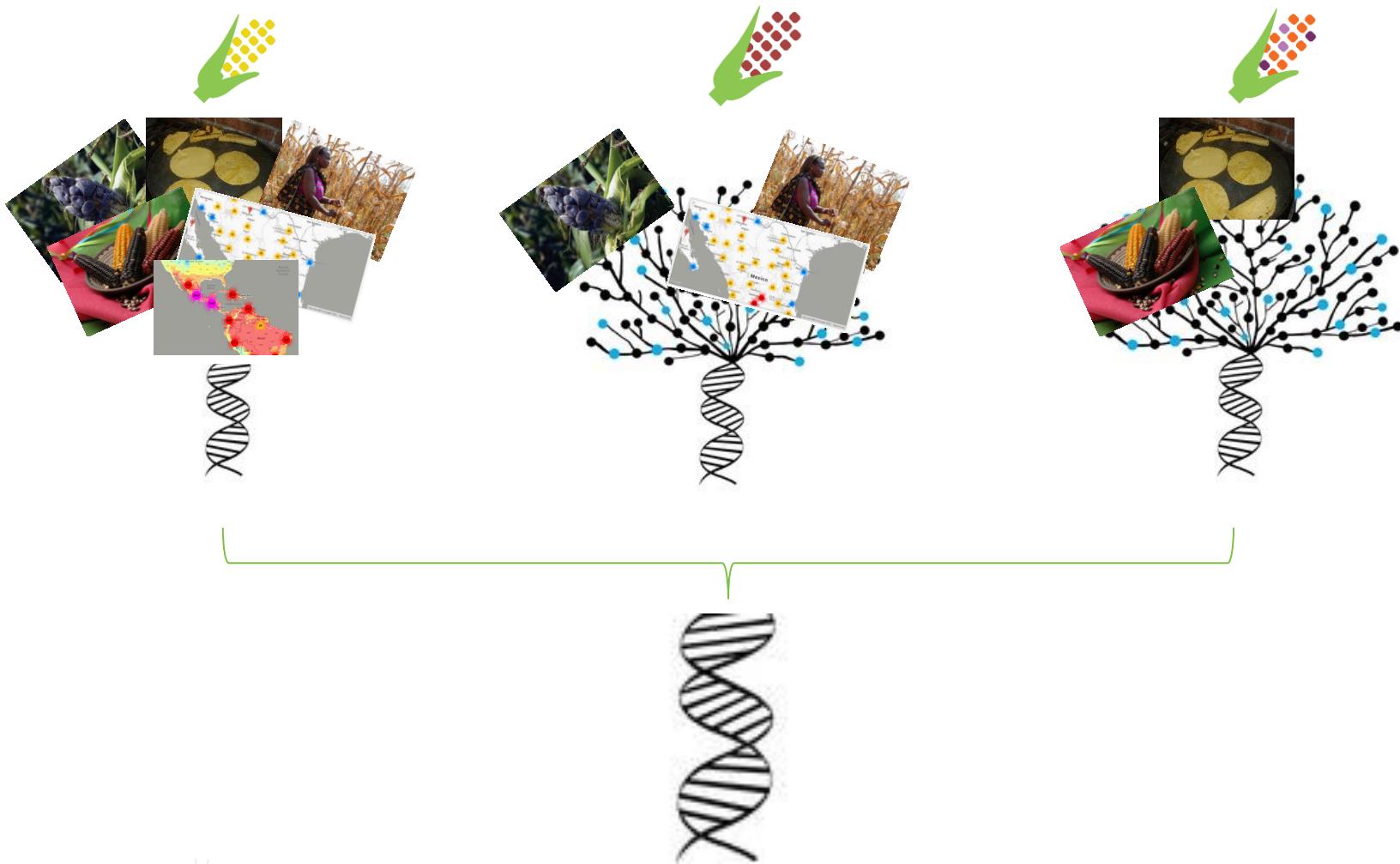
Why an atlas?



Why molecular?



Why molecular?



Components

- **Data-** genotypic, phenotypic, GIS, passport.
- **Knowledge-** marker-trait associations, germplasm panels.
- **Tools-** data collection software, online query tools, data visualization tools and software, statistical analysis methods, training links.



KDSmart – Android based tablet and phone phenotypic data collection.



KDXplore – Computer based trial data management and data curation tool.



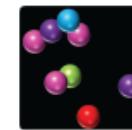
Statistical analysis tools and scripts to conduct analysis of genotypic, phenotypic and GIS data.



Online data warehouse and knowledge center with data query, visualization and download capability germinate. seedsofdiscovery.org



Flapjack – Graphical genotype viewer helps identify germplasm and diversity of highest value.



CurlyWhirly – multidimensional data visualization to help understand genetic diversity and identify the most useful landraces.

Using the MMA

ATLAS USE

Identify new variation for heat tolerance

Process

Find all landraces in target environment of interest

Find landraces which come from places with long term high temperatures during flowering or perform well under high temperature stress

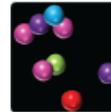
Use genotypic data to conduct diversity analysis and define small representative set of landraces for field evaluation

Conduct field evaluations to identify the best heat tolerant landraces

Upload data to germinate to share with the broader community

Molecular Atlas Tool/Resource

Germinate 3



Find all landraces in target environment of interest

Find landraces which come from places with long term high temperatures during flowering or perform well under high temperature stress



Find the relevant data

germinate.seedsofdiscovery.org/maize/#allele-freq-dataset

Search

MasAgro SAGARPA SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

Search Germinate... Contact us: seed@masagro.org

INTRO DATA + ENVIRONMENT + GROUPS ABOUT + SEARCH LOGOUT

9066 0 75

Germinate 3 SeeD Maize Database

Allele Frequency Data Export

Please select a dataset for the export process.

Datasets

ID	Experiment Type	Experiment Name	Dataset Description	Contact	Date	Size	Data points
57	allelefreq	Allele frequency evaluation of selected accessions	GUAT286_Bulk.txt	Sarah Hearne (S.Hearne@cgiar.org)	1	64560	
58	allelefreq	Allele frequency evaluation of selected accessions	GUAT329_Bulk.txt	Sarah Hearne (S.Hearne@cgiar.org)	1	60384	
59	allelefreq	Allele frequency evaluation of selected accessions	OAXA173_Bulk.txt	Sarah Hearne (S.Hearne@cgiar.org)	1	64124	
60	allelefreq	Allele frequency evaluation of selected accessions	OAXA248_Bulk.txt	Sarah Hearne (S.Hearne@cgiar.org)	1	60504	
61	allelefreq	Allele frequency evaluation of selected accessions	PUEB75_Bulk.txt	Sarah Hearne (S.Hearne@cgiar.org)	1	52380	

ETLA
FINCA DE LOS CORRES
GUADALUPE ETLA
MACUILTIANGUIS
MOJONERA

15.08	16.65	18.05	19.81	19.76	18.66	17.87	18.02	17.69	16.93	15.81	14.89
16.17	17.75	18.84	20.32	20.56	19.36	18.78	19.02	18.52	17.84	16.93	16.21
15.08	16.65	18.05	19.81	19.76	18.66	17.87	18.02	17.69	16.93	15.81	14.89
14.59	16.24	17.76	19.78	19.53	18.69	17.57	18.02	17.80	16.73	15.49	14.57
15.08	16.65	18.05	19.81	19.76	18.66	17.87	18.02	17.69	16.93	15.81	14.89

8.80 -103.14 1040 MEXICO

Latest News Latest Projects



Using the MMA

ATLAS USE

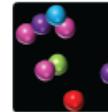
Identify new variation for heat tolerance

Process

- Find all landraces in target environment of interest
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Molecular Atlas Tool/Resource

Germinate 3



Use genotypic data to conduct diversity analysis and define small representative set of landraces for field evaluation



Analyze data



SixGroupsSNP20 - Excel

clustering of 1965 accessions

dist
hclust (*, "ward.D2")

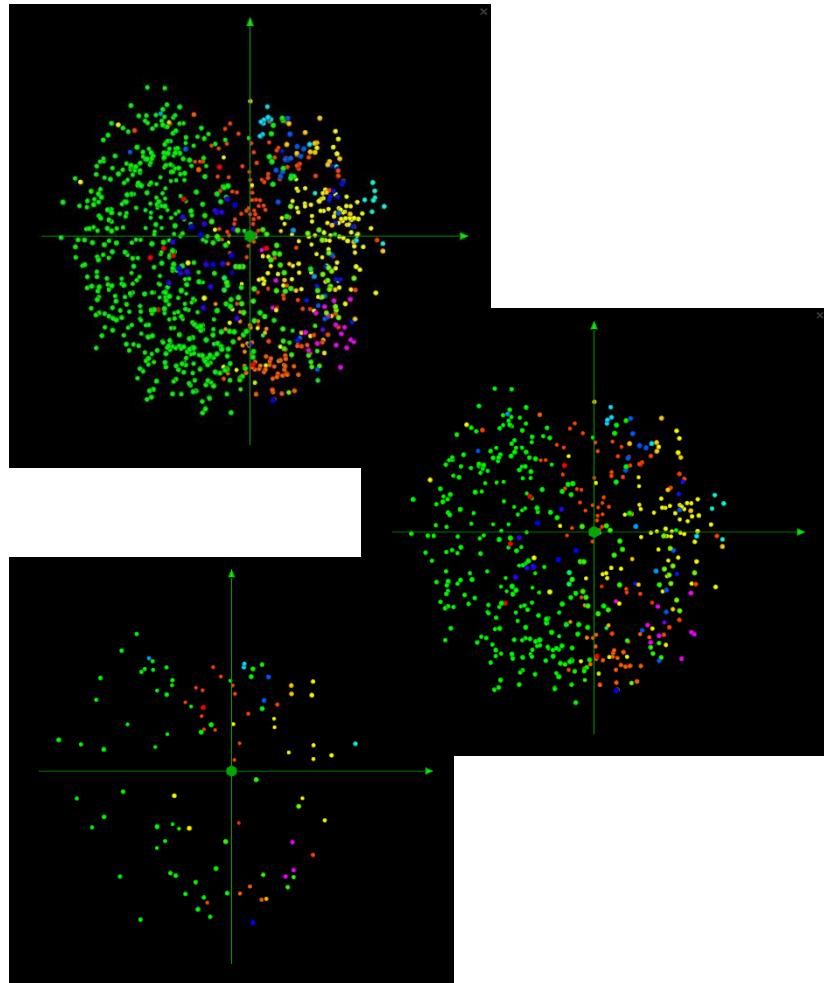
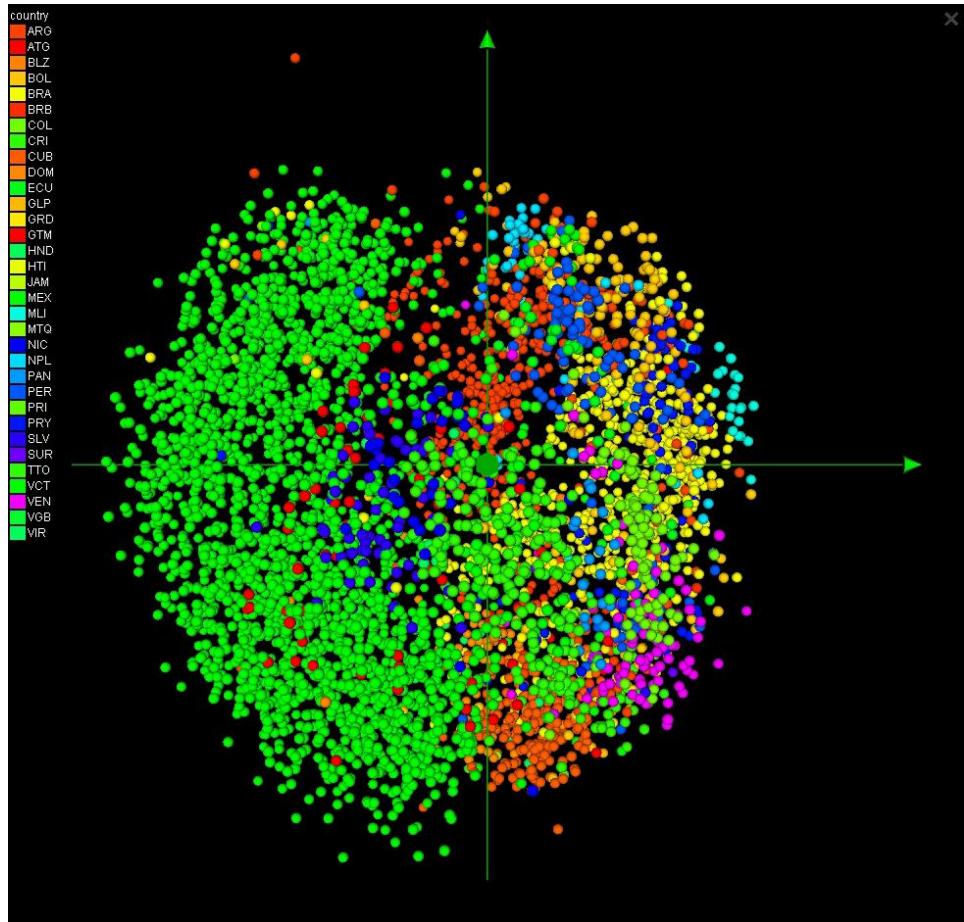
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1	ncolDist	geno	ngr50-6	grTukeym1	grTukeym2	grTukeym3	grTukeymean123		gr6	tukey1	lsmean
2	1 X553259		1	3	2	3		2	6	1	1.1606
3	2 X553283		2	4	3	4		4	3	2	1.3178
4	3 X553295		1	3	2	3		2	1	3	1.5539
5	4 X552829		1	3	2	3		2	5	4	1.8131
6	5 X553274		1	3	2	3		2	2	4	1.8365
7	6 X553156		1	3	2	3		2	4	5	2.0906
8	7 X48987		1	3	2	3		2			
9	8 X693006		1	3	2	3		2			
10	9 X553362		1	3	2	3		2			
11	10 X553386		1	3	2	3		2	3	1	1.3293
12	11 X590299		2	4	3	4		4	6	12	1.3700
13	12 X553351		2	4	3	4		4	1	2	1.4830
14	13 X553375		2	4	3	4		4	2	3	1.8585
15	14 X590263		1	3	2	3		2	5	4	2.0411
16	15 X692936		1	3	2	3		2	4	5	2.1966
17	16 X590286		2	4	3	4		4			
18	17 X688456		2	4	3	4		4			
19	18 X553388		2	4	3	4		4			
20	19 X553436		2	4	3	4		4	6	1	1.4018
21	20 X553377		2	4	3	4		4	3	2	1.5522
22	21 X552782		2	4	3	4		4	1	3	1.7561
23	22 X553389		2	4	3	4		4	4	3	1.7667
24	23 X553401		2	4	3	4		4	5	3	1.8050
25	24 X553413		2	4	3	4		4	2	4	2.3980
26	25 X590302	2	4	3	4	4					
27	26 X552794	1	3	2	3	2	> cld(lsm123, alpha=0.01)				
28	27 X553135	1	3	2	3	2		gr6	tukey123	lsmean	
29	28 X552806	1	3	2	3	2		6	1	1.3108	
30	29 X553378	1	3	2	3	2		3	1	1.3998	
31	30 X553390	1	3	2	3	2		1	2	1.5977	
32	31 X553402	1	3	2	3	2		5	3	1.8864	
33	32 X553414	1	3	2	3	2		4	4	2.0180	

environment history





Visualize, Interpret, Select



Using the MMA

ATLAS USE

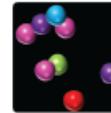
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Molecular Atlas Tool/Resource

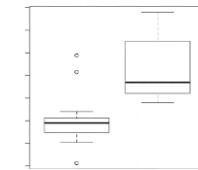
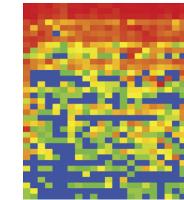
Germinate 3



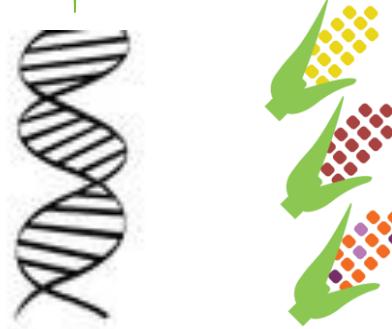
Conduct field evaluations to identify the best heat tolerant landraces

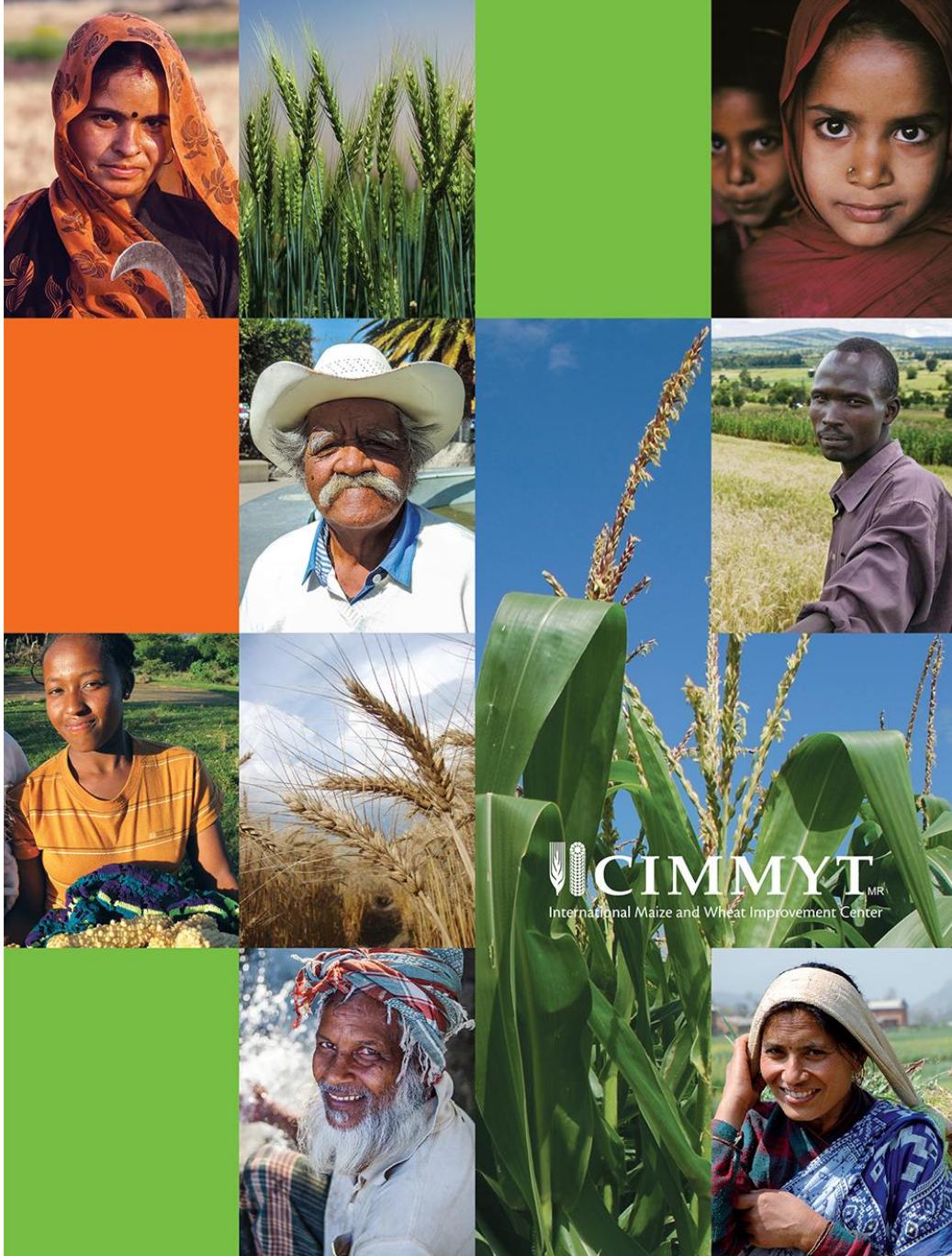


Evaluate



Enrich the Atlas





Thank you for your interest!

 CIMMYT^{MR}
International Maize and Wheat Improvement Center