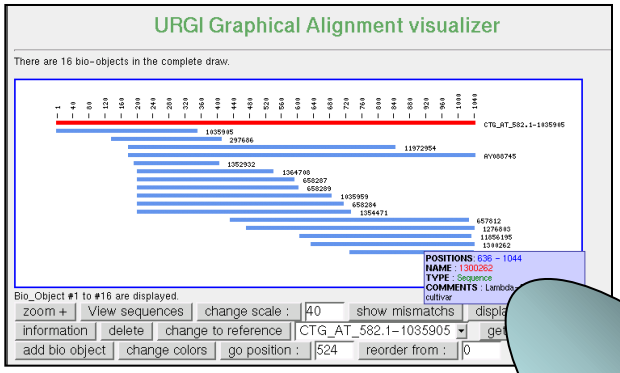
Wheat data on GnpIS

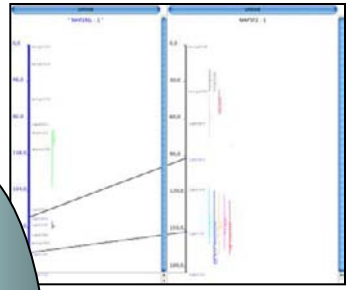
the INRA URGI plant information system

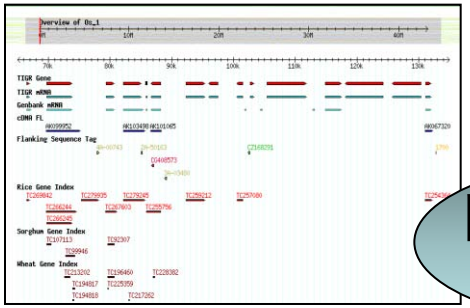
Michaël Alaux

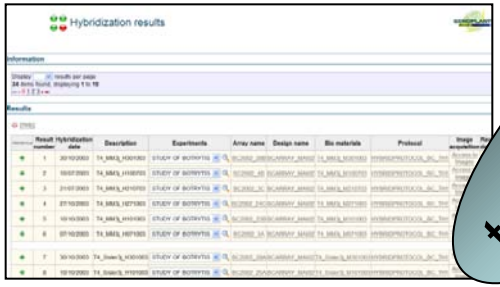
ITMI 19th & COST Tritigen 3th
Clermont-Ferrand
August 31-September 4th, 2009

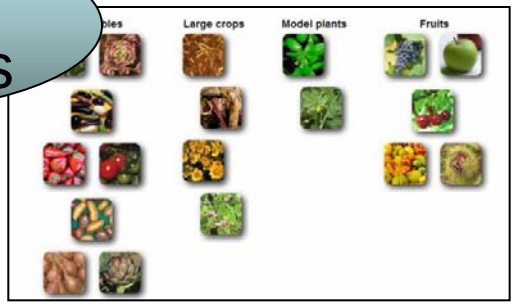
GnpIS the URGI Information System

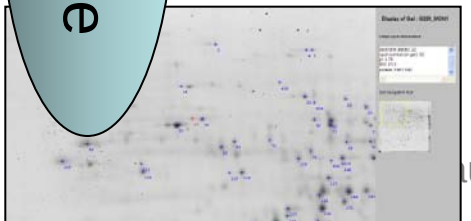








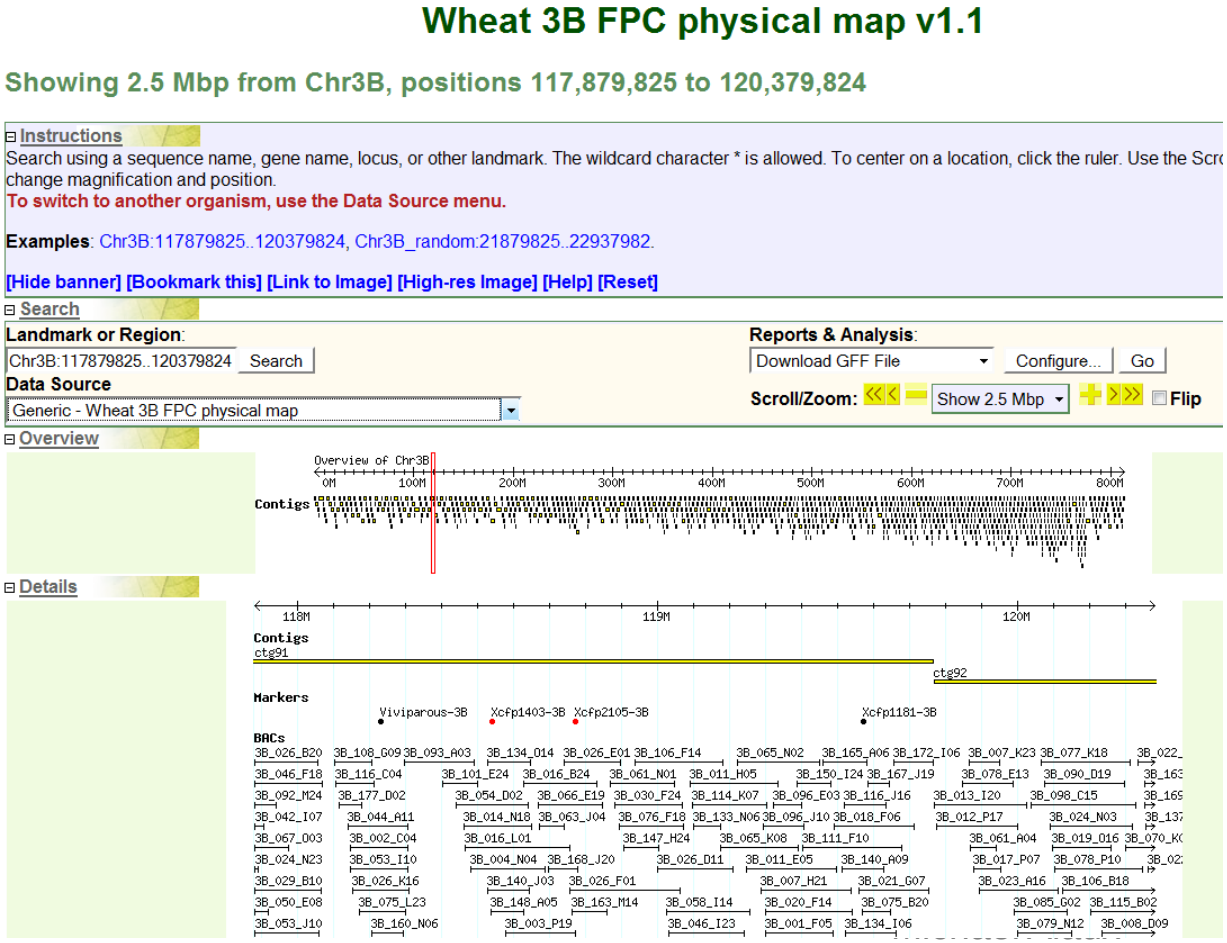




GnpGenome: wheat physical map

- GBrowse interface for Wheat 3B physical map

http://urgi.versailles.inra.fr/gbrowse/cgi-bin/gbrowse/Wheat_FPC/

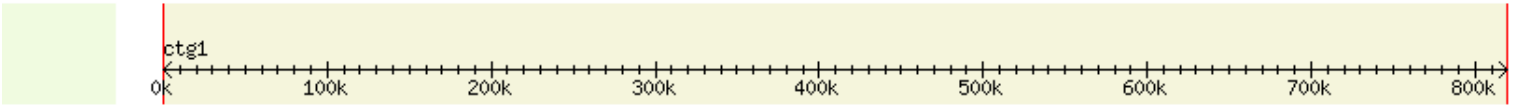


GnpGenome: wheat physical map

- New version 2.1 *(in production soon)*
  - Contig centric view
  - GBrowse 1.69
  - Published version of the 3B FPC assembly
  - Deletion bin track
  - All features are now indexed

Paux *et al.*, Science (2008) *322:101-104*

GnpGenome: wheat physical map

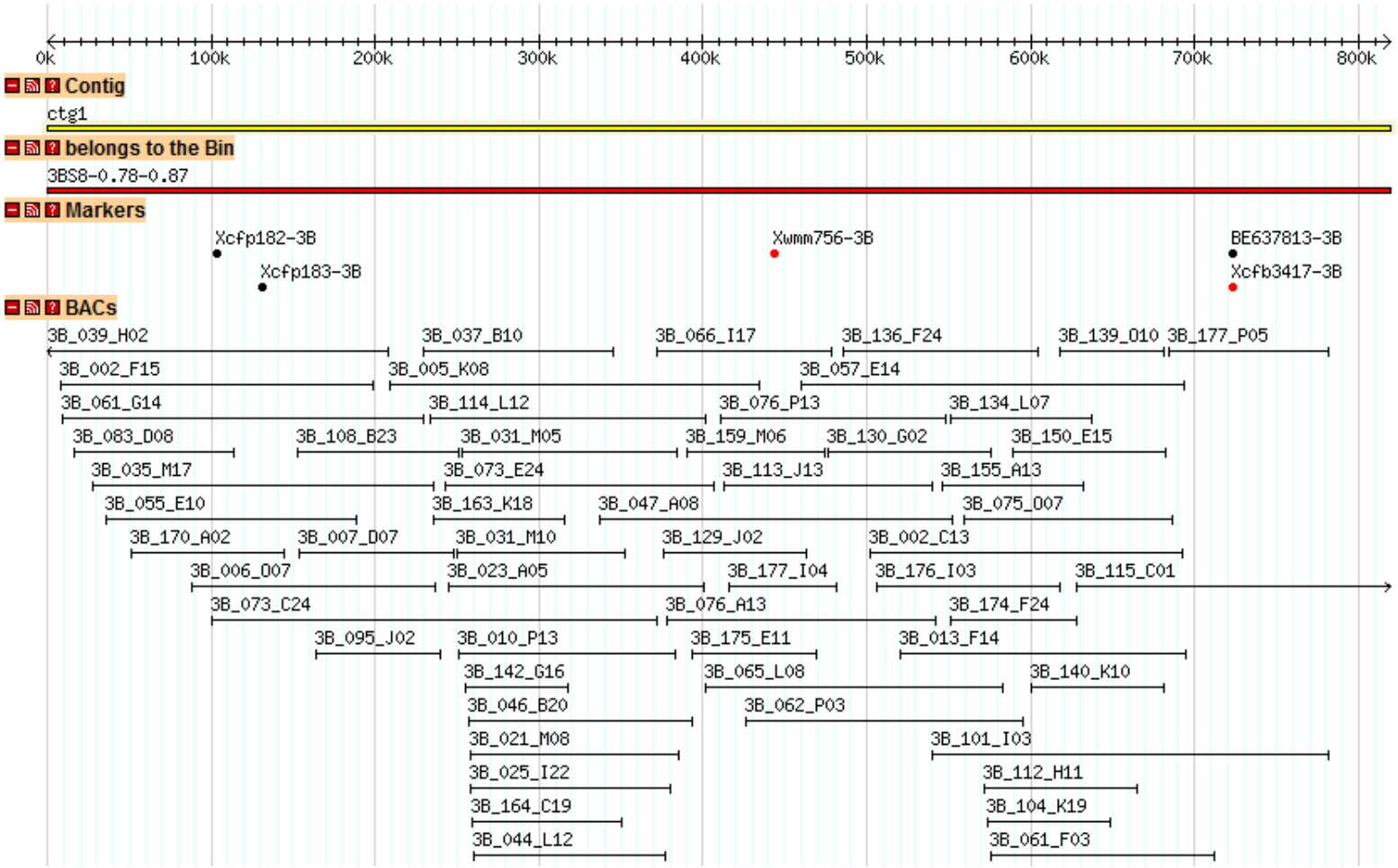


Contig

Deletion bin

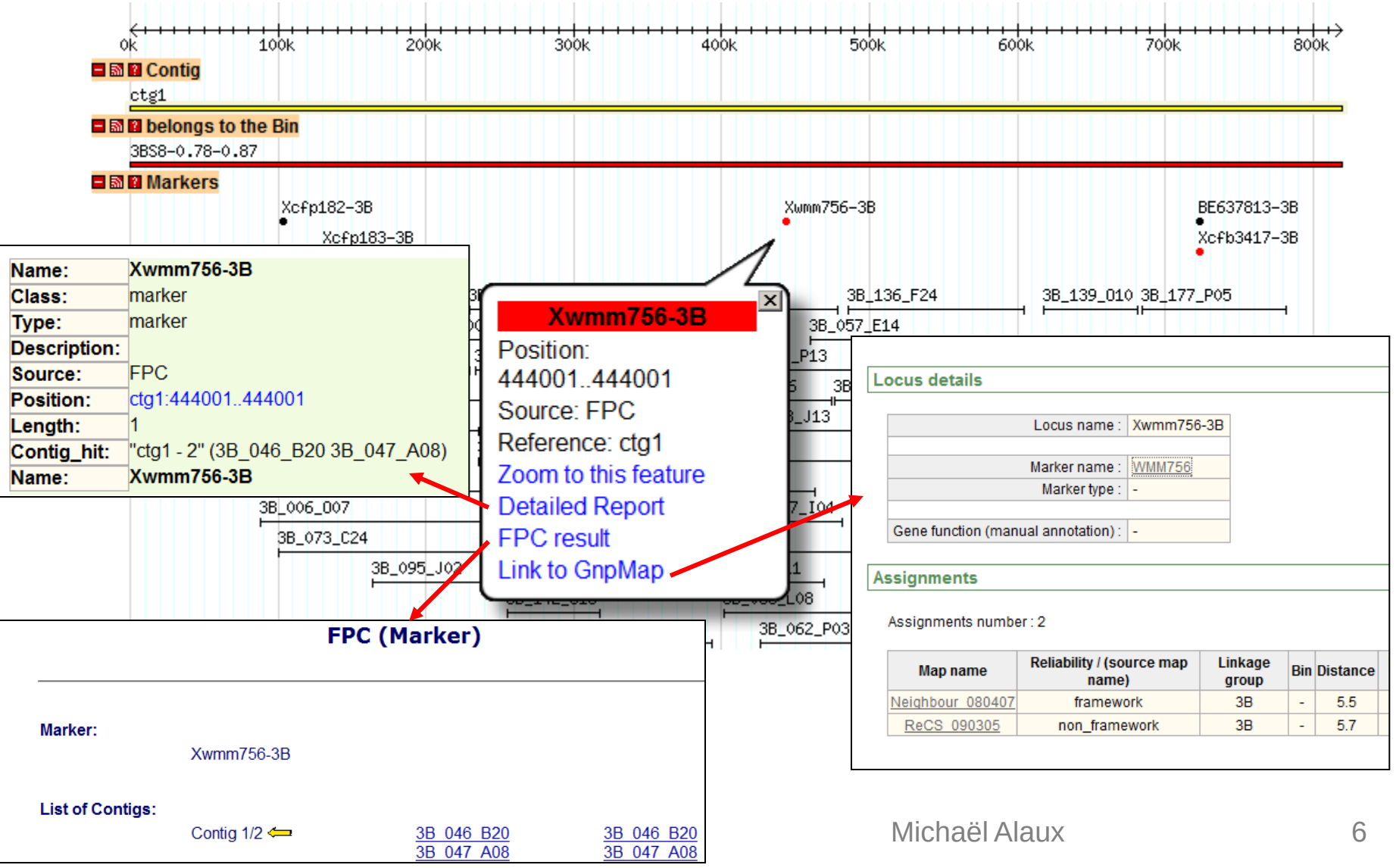
Markers

BACs



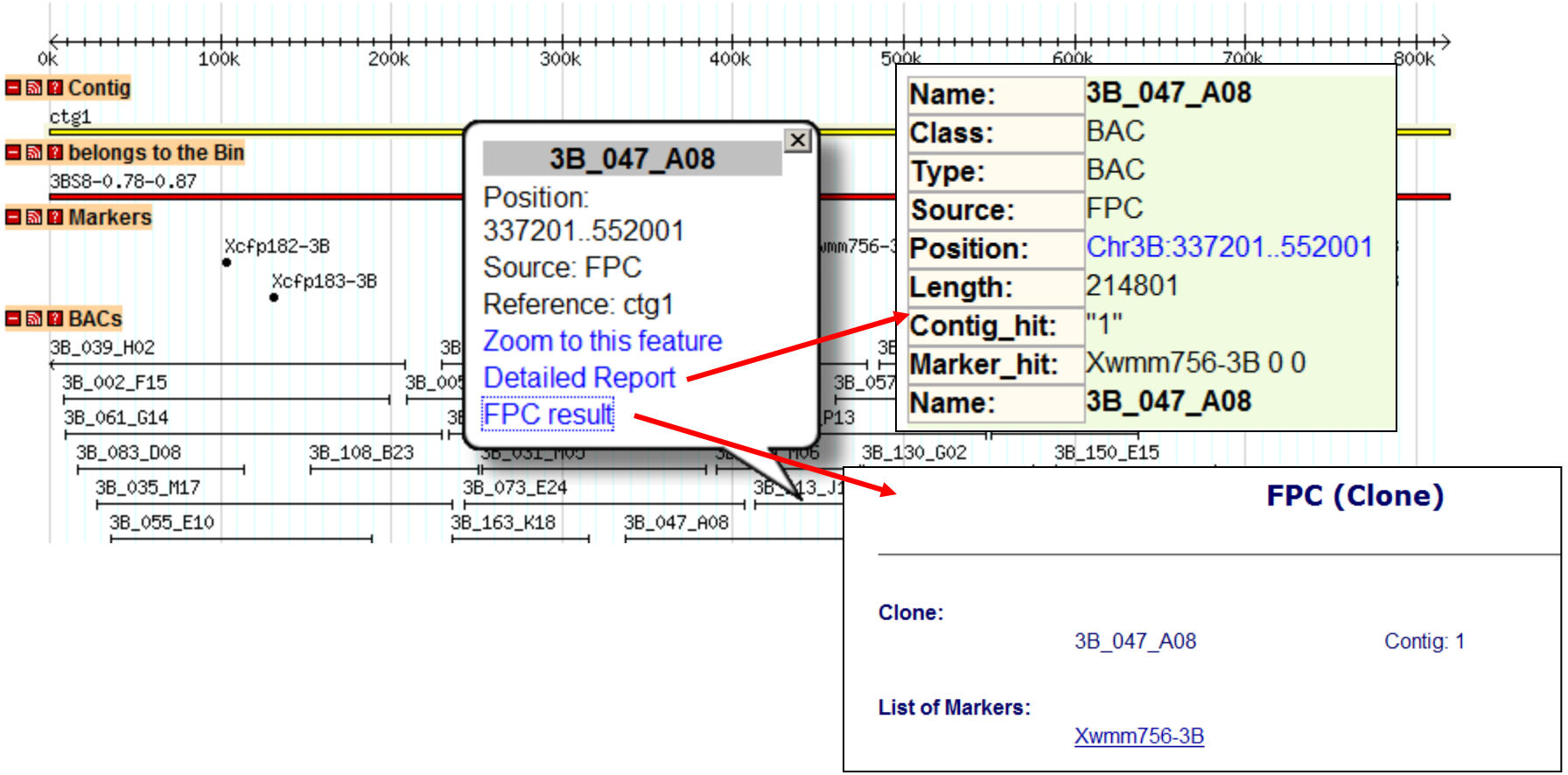
GnpGenome: wheat physical map

- Markers in red have additionnal details in GnpMap



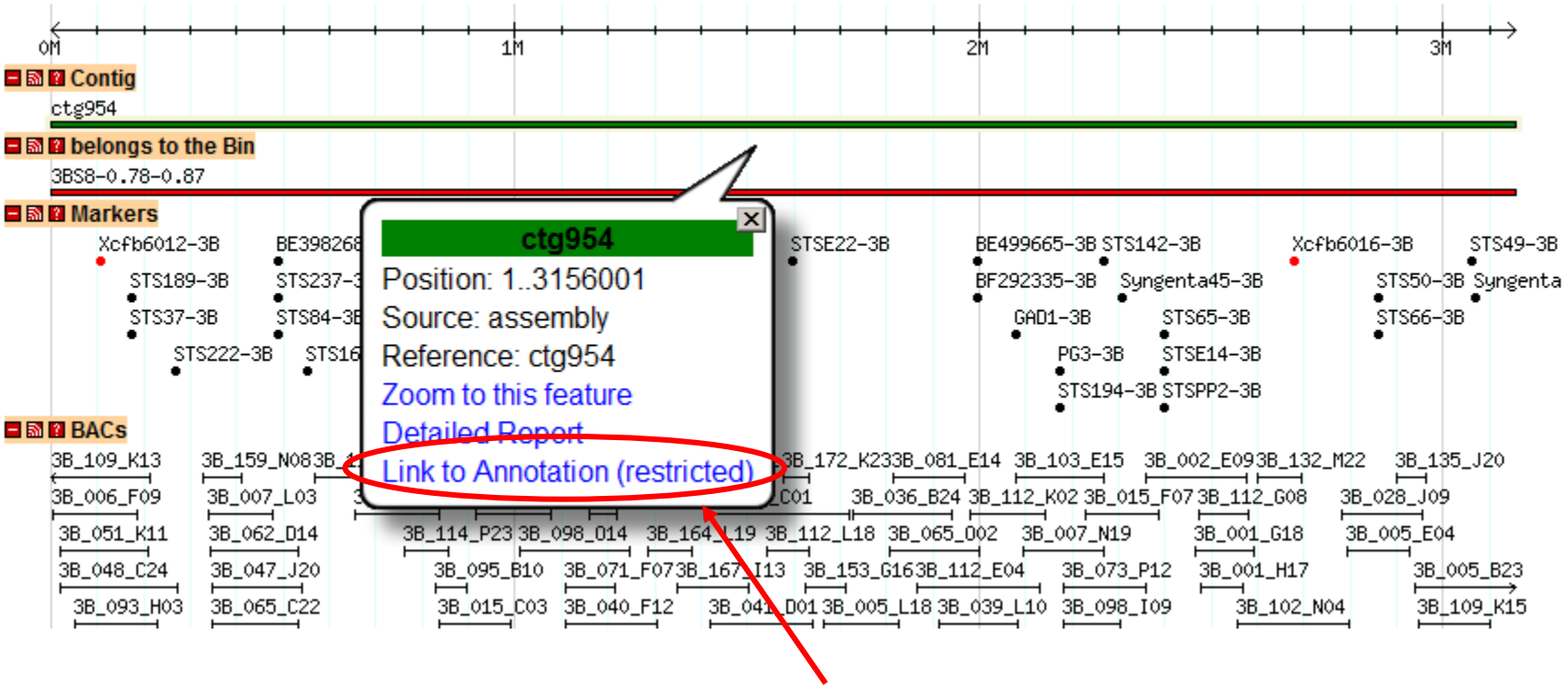
GnpGenome: wheat physical map

- BACs informations



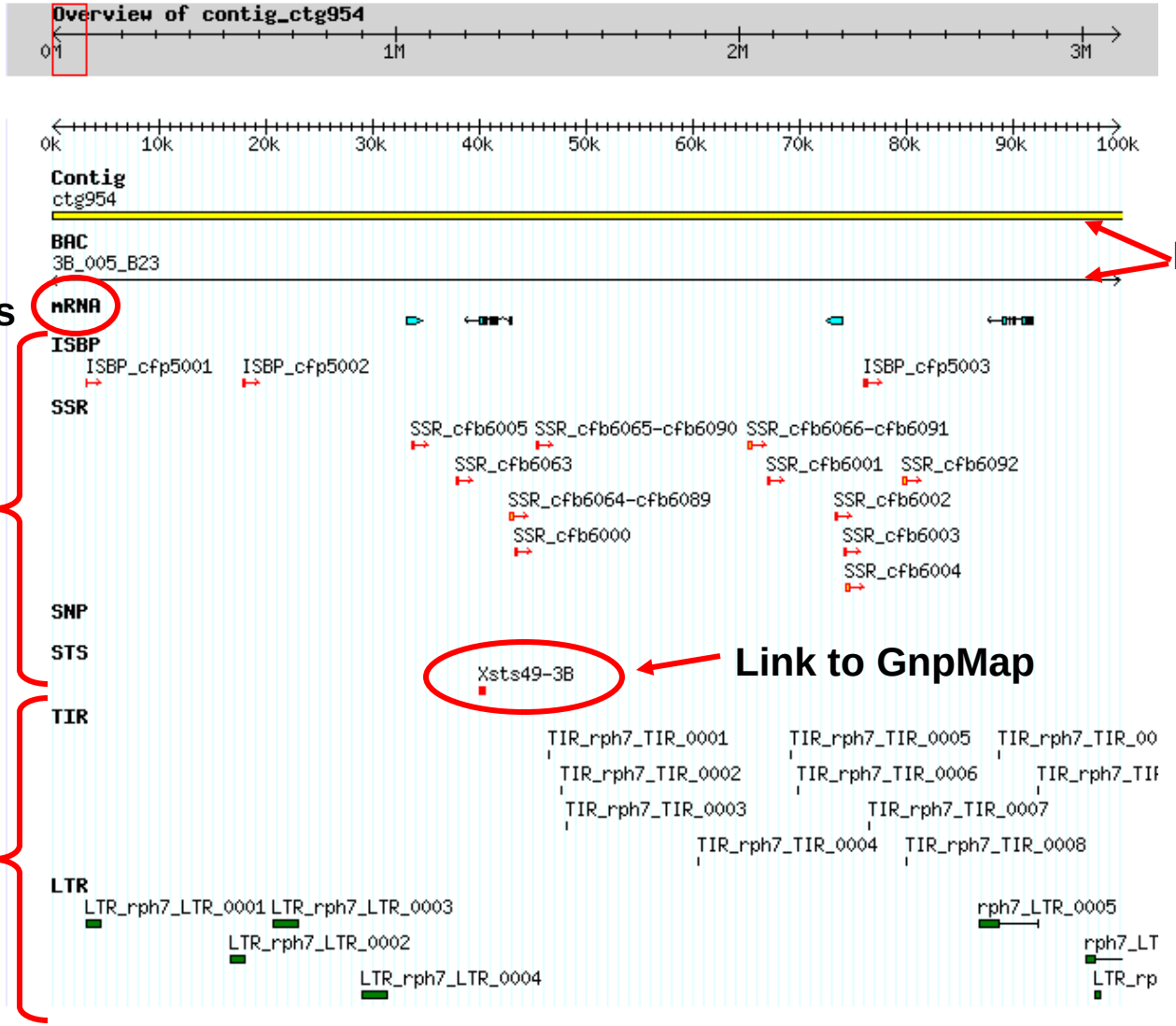
GnpGenome: wheat physical map

- Contig or BAC in green are annotated



Link to the wheat BAC annotation browser

GnpGenome: wheat BAC annotation



Contig

BACs

Annotations

Markers

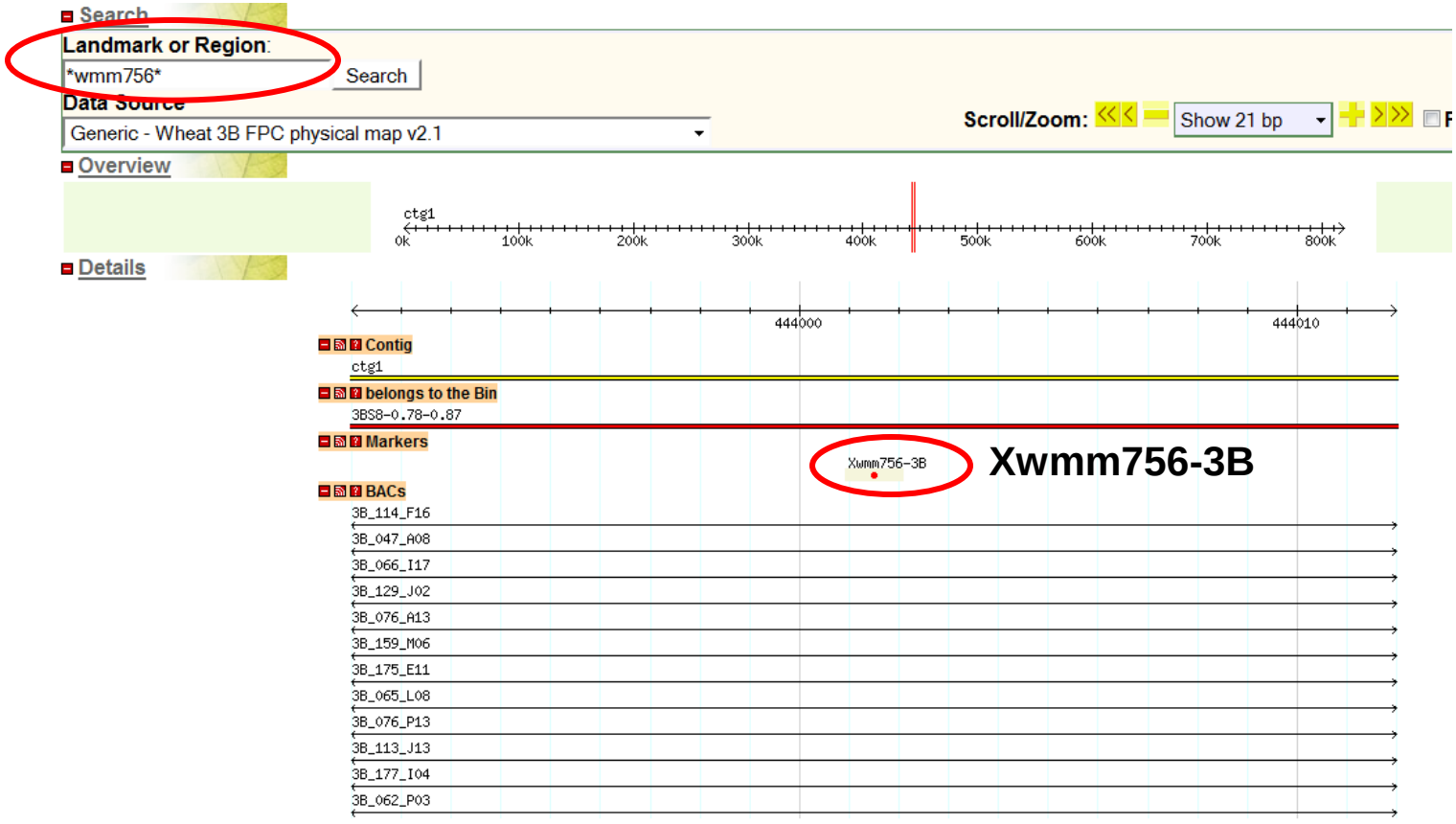
Repeats

Link to physical map

Link to GnpMap

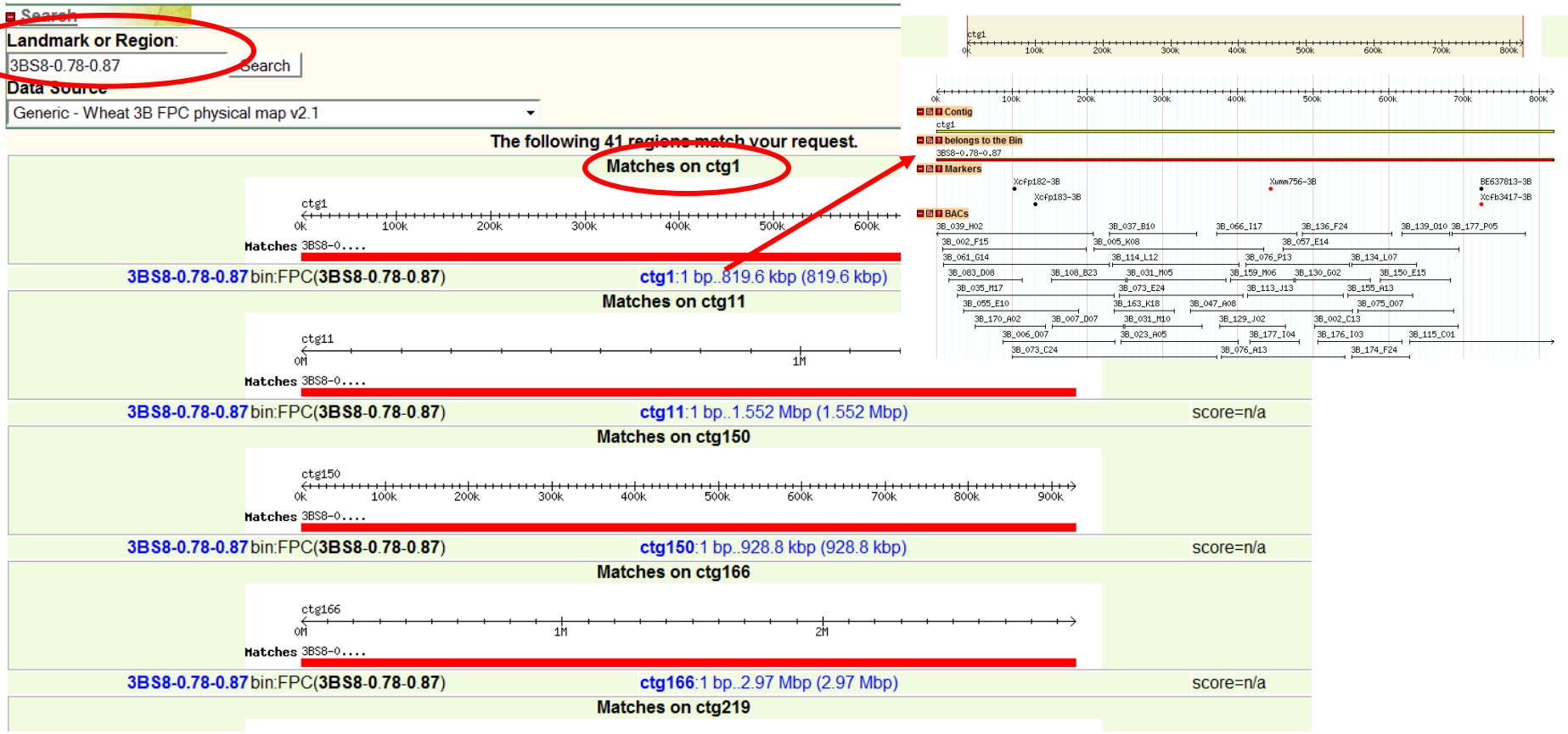
GnpGenome: wheat physical map

- Searches examples
  - a marker with wildcards: *wmm756*



GnpGenome: wheat physical map

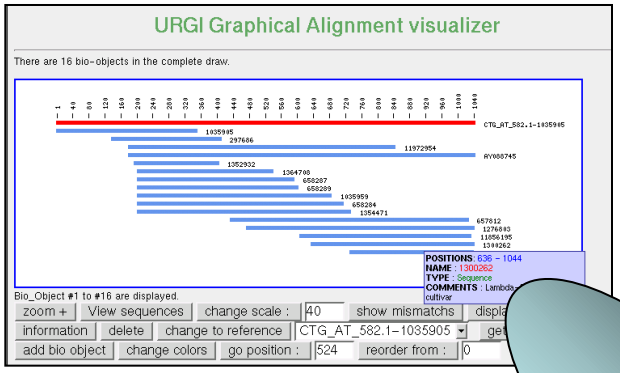
- a bin: 3BS8-0.78-0.87



GnpGenome: wheat

- Perspectives
  - Physical maps of other wheat chromosomes
  - Access to the physical map by a deletion bin view
  - Next version of the wheat BAC annotation browser directly loaded by **TriAnnot pipeline**

GnpIS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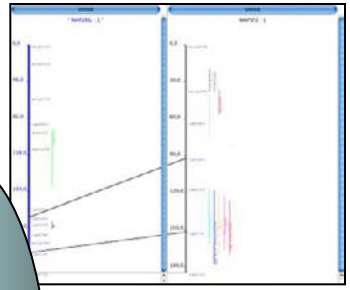

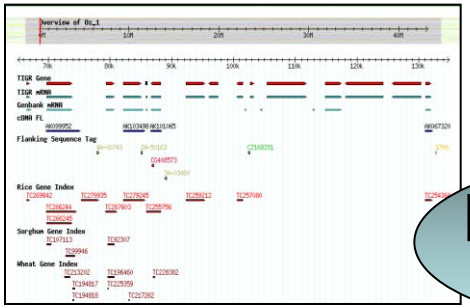

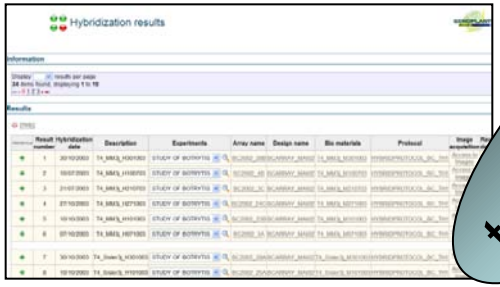
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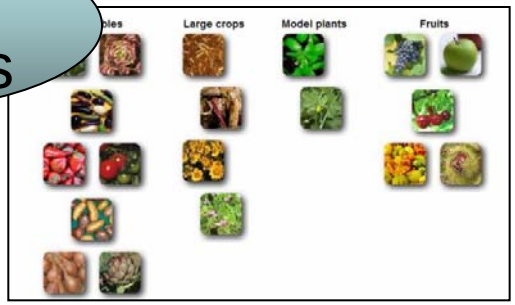
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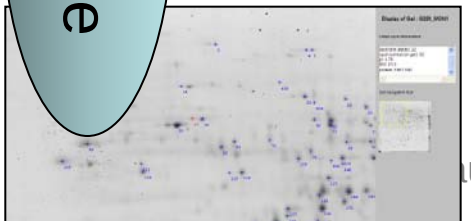

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phenotype

GnpMap

- The genetic mapping database

http://urgi.versailles.inra.fr/GnpMap/

Map name	Population	Taxon
ARE_050606	ARE	Triticum aestivum
AXO_050428	AXO	Triticum aestivum
CtCs_040630	CtCs	Triticum aestivum
DEL_050308	Deletion	Triticum aestivum
Ditelo_050308	NT_DT	Triticum aestivum
ITMI_040618	ITMI	Triticum aestivum
Neighbour_080407	TaVirtualPop03	Triticum aestivum
NulliTetra_050308	NT_DT	Triticum aestivum
RER_040618	RER	Triticum aestivum
RER_050614	RER	Triticum aestivum
RLAc_071219	RLAc	Triticum aestivum
ReCS_090305	ReCS	Triticum aestivum
SOds_071219	SOds	Triticum aestivum
SumStoa_090225	SumStoa	Triticum aestivum
SupBW_071212	SupBW	Triticum aestivum
TXO_050621	TXO	Triticum aestivum
TaVirtualPop01_071219	TaVirtualPop01	Triticum aestivum
TaVirtualPop02_090219	TaVirtualPop02	Triticum aestivum
WuMa_071219	WuMa	Triticum aestivum

✓ 16 wheat genetic maps with different versions of:
ARE, AXO, CtCs, ITMI, RER, Neighbour, RLAc, ReCS, SOds, SumStoa,SupBW,TXO,TaVirtualPop, WuMa.

✓ 3 wheat cytogenetic maps:
DEL, Ditelo, NulliTetra.

✓ more than 10 000 wheat markers

✓ more than 500 wheat QTLs

Data transfer to public site in progress

GnpMap

- Marker results

Map name

Marker name

Marker type

Chromosome

Distance cM

Result number	Map name	Locus name	Marker name	Marker type	Marker origin	Goal	Gene function (manual annotation)	Reliability / (source map name)	Linkage group	Bin	Distance
1	ITMI_040618	XksuD14-1A.1	KSUD14	RFLP	clone	Mapping	UNKNOWN	framework	1A	XksuD14-1A.1_Xcdo426-1A	0.0
2	ITMI_040618	Xcdo426-1A	CDO426	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xcdo426-1A_XksuE18-1A	20.7
3	ITMI_040618	XksuE18-1A	KSUE18	RFLP	clone	Mapping	UNKNOWN	framework	1A	XksuE18-1A_Xrz244-1A	31.4
4	ITMI_040618	Xrz244-1A	RZ244	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xrz244-1A_Xcdo312-1A	45.4
5	ITMI_040618	Xcdo312-1A	CDO312	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xcdo312-1A_Glu-A1	57.6
6	ITMI_040618	Glu-A1	GLUHMW	1D	gene	Mapping	UNKNOWN	framework	1A	Glu-A1_Xmwg733-1A	65.9
7	ITMI_040618	Xmwg733-1A	MWG733	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xmwg733-1A_Xcdo1160-1A	84.1
8	ITMI_040618	Xcdo1160-1A	CDO1160	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xcdo1160-1A_Xmwg632-1A	134.1
9	ITMI_040618	Xmwg632-1A	MWG632	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xmwg632-1A_Xmwg912-1A	138.4
10	ITMI_040618	Xmwg912-1A	MWG912	RFLP	clone	Mapping	UNKNOWN	framework	1A	Xmwg912-1A_Xwg241-1A	151.4

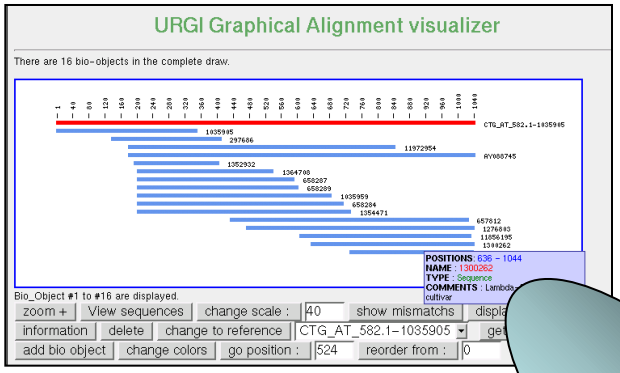
GnpMap

- QTL results

QTL name **Trait** **Localization**

Result number	QTL name	Theme	Trait	Trait description	Map name	Linkage group	LOD	R2	Distance	from	to	Reliability / (source map name)
1	QTL_cTRL_ARE-HD_GRRH_04_N-_1B	Seed nitrogen accumulation	TRL	root total length	ARE_050606	1B	2.63	10.4	0.0	0.0	12.3	unprojected
2	QTL_cRUE_ARE-HD_GRRH_04_N-_1B	Seed nitrogen accumulation	RUE	root radiation use efficiency	ARE_050606	1B	3.77	15.7	38.0	35.7	48.7	unprojected
3	QTL_tRDM_ARE-HD_GRRH_04_N-_1B	Seed nitrogen accumulation	RDM	root dry matter	ARE_050606	1B	3.08	10.3	38.0	35.7	48.7	unprojected
4	QTL_GLUL_ARE-HD_MOCC_01_N+_1B	Seed nitrogen accumulation	GLUL	leaf glucose content	ARE_050606	1B	2.63	7.7	70.0	59.0	84.0	unprojected
5	QTL_FWR_ARE-HD_MOCC_01_N-_3D	Seed nitrogen accumulation	FWR	root fresh weight	ARE_050606	3D	2.82	18.3	63.0	45.0	85.0	unprojected
6	QTL_SACL_ARE-HD_MOCC_01_N+_4B	Seed nitrogen accumulation	SACL	leaf saccharose content	ARE_050606	4B	2.71	9.5	20.0	0.0	34.0	unprojected
7	QTL_LRR_ARE-HD_MOCC_01_N+_4B	Seed nitrogen accumulation	LRR	leaf root ratio	ARE_050606	4B	5.54	12.5	31.0	24.0	38.0	unprojected
8	QTL_FRUL_ARE-HD_MOCC_01_N+_4B	Seed nitrogen	FRUL	leaf fructose	ARE_050606	4B	2.75	8.0	36.0	0.0	55.0	unprojected

GnpIS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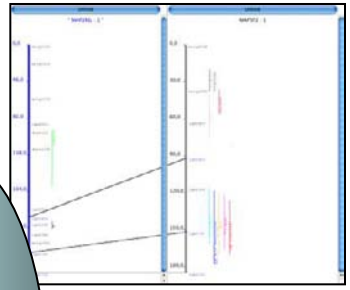

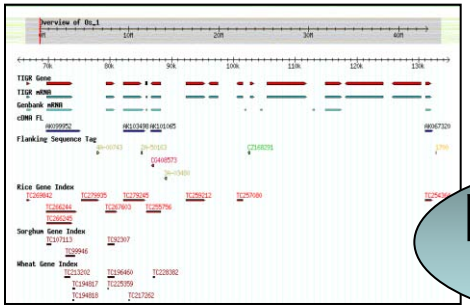

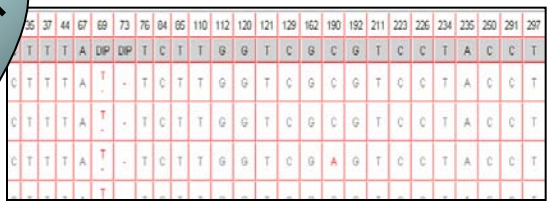

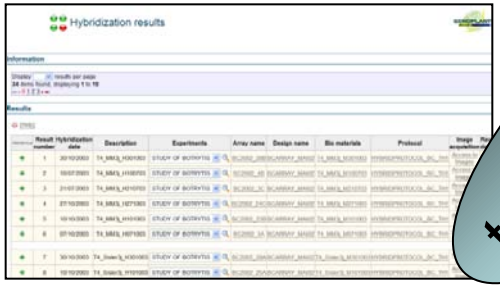
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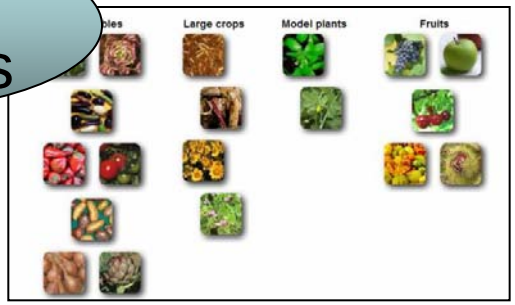
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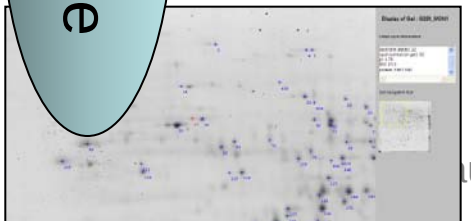

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GnpSNP

- The polymorphism database

http://urgi.versailles.inra.fr/GnpSNP

  - SubSNP results

Information

Display results per page
2091 items found, displaying **1** to **10**
« 1 2 3 4 5 »

Results

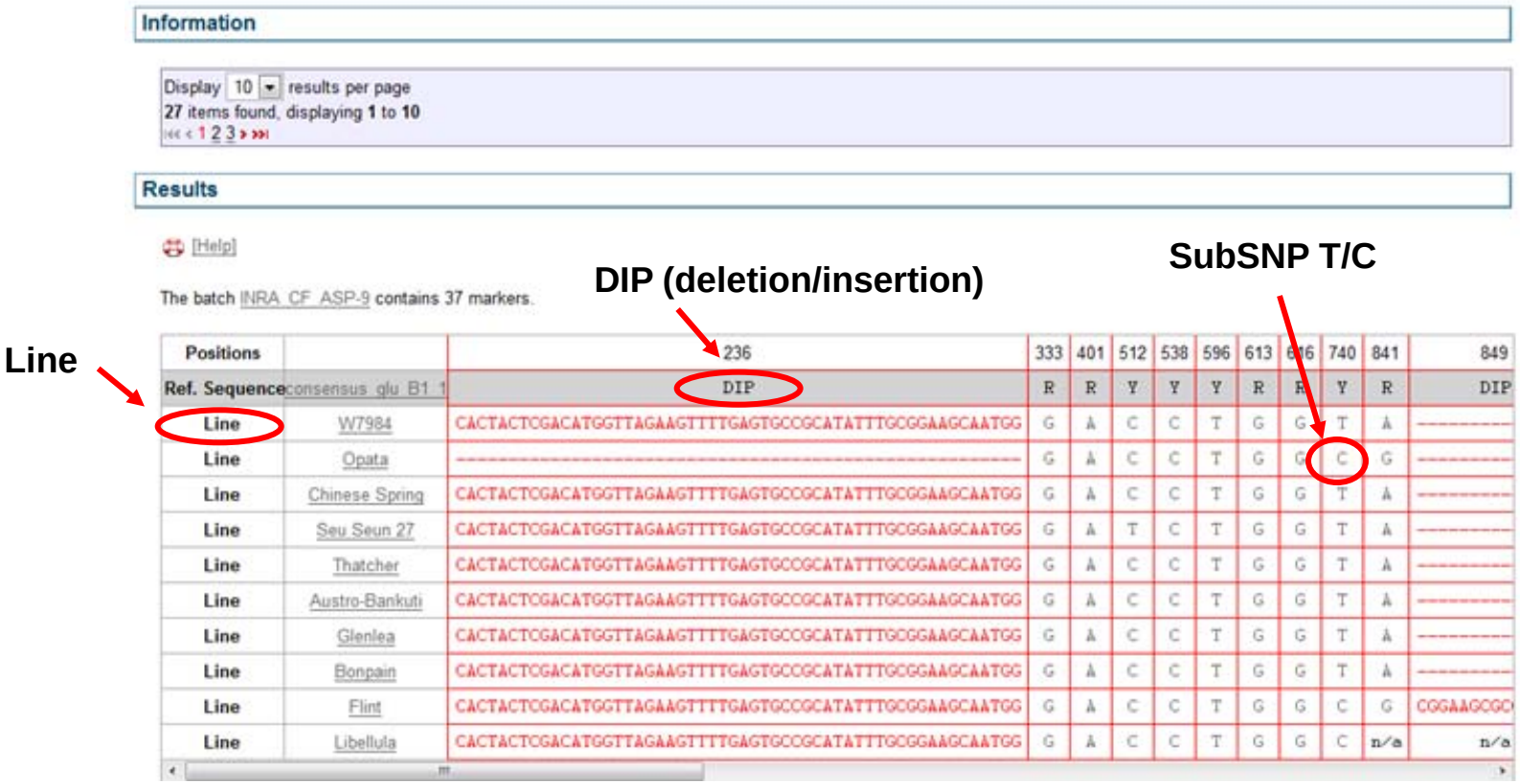
[Help]

SubSNP name **Line** **Position on the Ref Seq**

#	SubSNP name	Project	Batch	Line	Ref. sequence	Position on ref. seq.
1	INRA_CF_ASP_PbfA_343_1	CP1P5	INRA_CF_ASP-5	W7984	consensus_PBF_A	343
2	INRA_CF_ASP_PbfA_343_14	CP1P5	INRA_CF_ASP-5	Renan	consensus_PBF_A	343
3	INRA_CF_ASP_PbfA_343_16	CP1P5	INRA_CF_ASP-5	Récital	consensus_PBF_A	343
4	INRA_CF_ASP_PbfA_343_2	CP1P5	INRA_CF_ASP-5	Opata	consensus_PBF_A	343
5	INRA_CF_ASP_PbfA_343_22	CP1P5	INRA_CF_ASP-5	Arche	consensus_PBF_A	343
6	INRA_CF_ASP_PbfA_343_4	CP1P5	INRA_CF_ASP-5	Seu Seun 27	consensus_PBF_A	343
7	INRA_CF_ASP_PbfA_343_9	CP1P5	INRA_CF_ASP-5	Flint	consensus_PBF_A	343
8	INRA_CF_ASP_PbfA_964_1	CP1P5	INRA_CF_ASP-5	W7984	consensus_PBF_A	964
9	INRA_CF_ASP_PbfA_964_10	CP1P5	INRA_CF_ASP-5	Libellula	consensus_PBF_A	964
10	INRA_CF_ASP_PbfA_964_11	CP1P5	INRA_CF_ASP-5	Elo	consensus_PBF_A	964

GnpSNP

- Genotype



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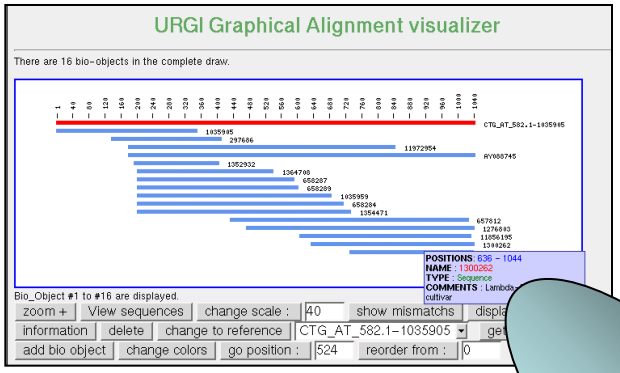
Line	Opata	----------	G	A	C	C	T	G	G	C	G	----------
Line	Chinese Spring	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	T	A	----------
Line	Seu Seun 27	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	T	C	T	G	G	T	A	----------
Line	Thatcher	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	T	A	----------
Line	Austro-Bankuti	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	T	A	----------
Line	Glenlea	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	T	A	----------
Line	Bonpain	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	T	A	----------
Line	Flint	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	C	G	CGGAAGCGC
Line	Libellula	CACTACTCGACATGGTTAGAAGTTTTGAGTGCCGCATATTTGCGGAAGCAATGG	G	A	C	C	T	G	G	C	n/a	n/a

GnpIS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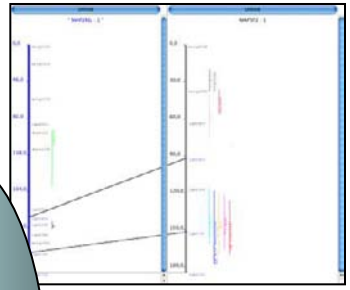
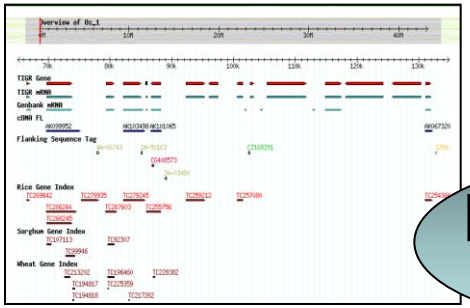
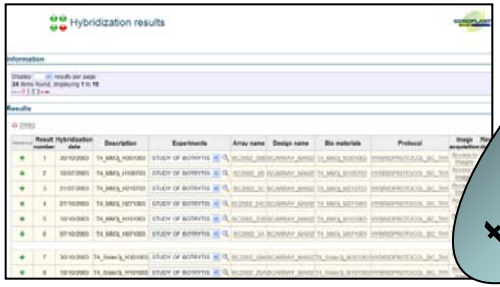
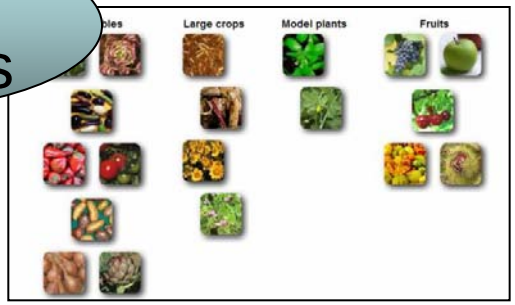
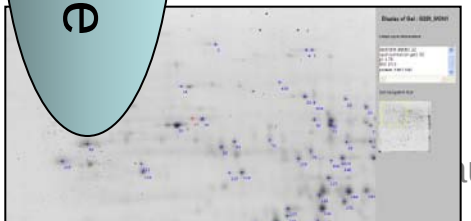





Hybridization results


Large crops
Model plants
Fruits



SIReGal

- The genetic collection database

http://urgi.versailles.inra.fr/siregal

Accessions

Results

The query has been restricted on: CEREALS [Help]

Display 20 results per page
1721 items found, displaying **1** to **20**
« 1 2 3 4 5 6 7 8 9 10 »

Accession name

Taxon = Triticum aestivum

#	Accession number	Accession name	Taxon	Biological status	Country
1	27	[illegible]	Triticum aestivum aestivum	Breeding/research material	FRA
2	7902	(210-14*AV)14	Triticum aestivum aestivum	Breeding/research material	FRA
3	7903	(210-14*AV)16	Triticum aestivum aestivum	Breeding/research material	FRA
4	8693	(3-7*PE63)22	Triticum aestivum aestivum	Breeding/research material	FRA
5	8485	(68*VM6)43	Triticum aestivum aestivum	Breeding/research material	FRA
6	7	(95-13*BEZOSTAIA)3-3	Triticum aestivum aestivum	Breeding/research material	FRA
7	8694	(ASVM4*BCP)4	Triticum aestivum aestivum	Breeding/research material	FRA
8	6013	(AU*AV)37-4	Triticum aestivum aestivum	Breeding/research material	FRA
9	8695	(AU*AV)83	Triticum aestivum aestivum	Breeding/research material	FRA
10	6005	(AV*109)11	Triticum aestivum aestivum	Breeding/research material	FRA
11	8	(BELLEVUE*PEVELE)1-2	Triticum aestivum aestivum	Breeding/research material	FRA
12	10	(BEZOSTAIA*PRIEUR)53	Triticum aestivum aestivum	Breeding/research material	FRA
13	8284	(C*V)5-7	Triticum aestivum aestivum	Breeding/research material	FRA
14	8285	(C*V)7-7	Triticum aestivum aestivum	Breeding/research material	FRA
15	8379	(CT*D)86	Triticum aestivum aestivum	Breeding/research material	FRA
16	9008	(CT*D)86	Triticum aestivum aestivum	Breeding/research material	FRA
17	1686	(CT*MO)b102	Triticum aestivum aestivum	Breeding/research material	FRA
18	6682	(L7*61)109	Triticum aestivum aestivum	Breeding/research material	FRA
19	8484	(MH*L7-61)82	Triticum aestivum aestivum	Breeding/research material	FRA

SIReGal

Accession: (210-13*M)1-37

Identification

Identification

Accession number :	27
Accession name :	(210-13*M)1-37
Synonyms :	ECPGR: GVS 1181 []
Subspecies :	Triticum aestivum aestivum
Pedigree :	Ae. ventricosa 11/COURTOT//MOISSON
Biological status :	Breeding/research material
Comment :	-

Origin

Origin

- Geographical origin : France
- Holding institution : Unite Mixte de Recherche Amelioration et Sante des Plantes, INRA

Evaluation data

Phenotypic data

-	Days to heading (Counted as days from sowing to 50% of panicles fully emerged)	136
-	Scale of days to heading	6
-	Wheat awnedness	3
-	Plant height (cm)	80
-	Scale of plant height	4
-	Scale of 1000 kernels weight	5
-	Susceptibility to Puccinia striiformis f. sp. hordei (Yellow rust) - Year 2000	5
-	Susceptibility to Puccinia recondita (Leaf rust) - Year 2000	3
-	Growth class	Hiver - Winter
-	Chromosome number	6X

Distribution

Distributor

Presence status :	Maintained
Available :	Yes, with restrictions
Distributor(s) :	Unite Mixte de Recherche Amelioration et Sante des Plantes, INRA

Collections

Collection

Part of :	WHEAT_INRA_COLLECTION WHEAT_NATIONAL_COLLECTION

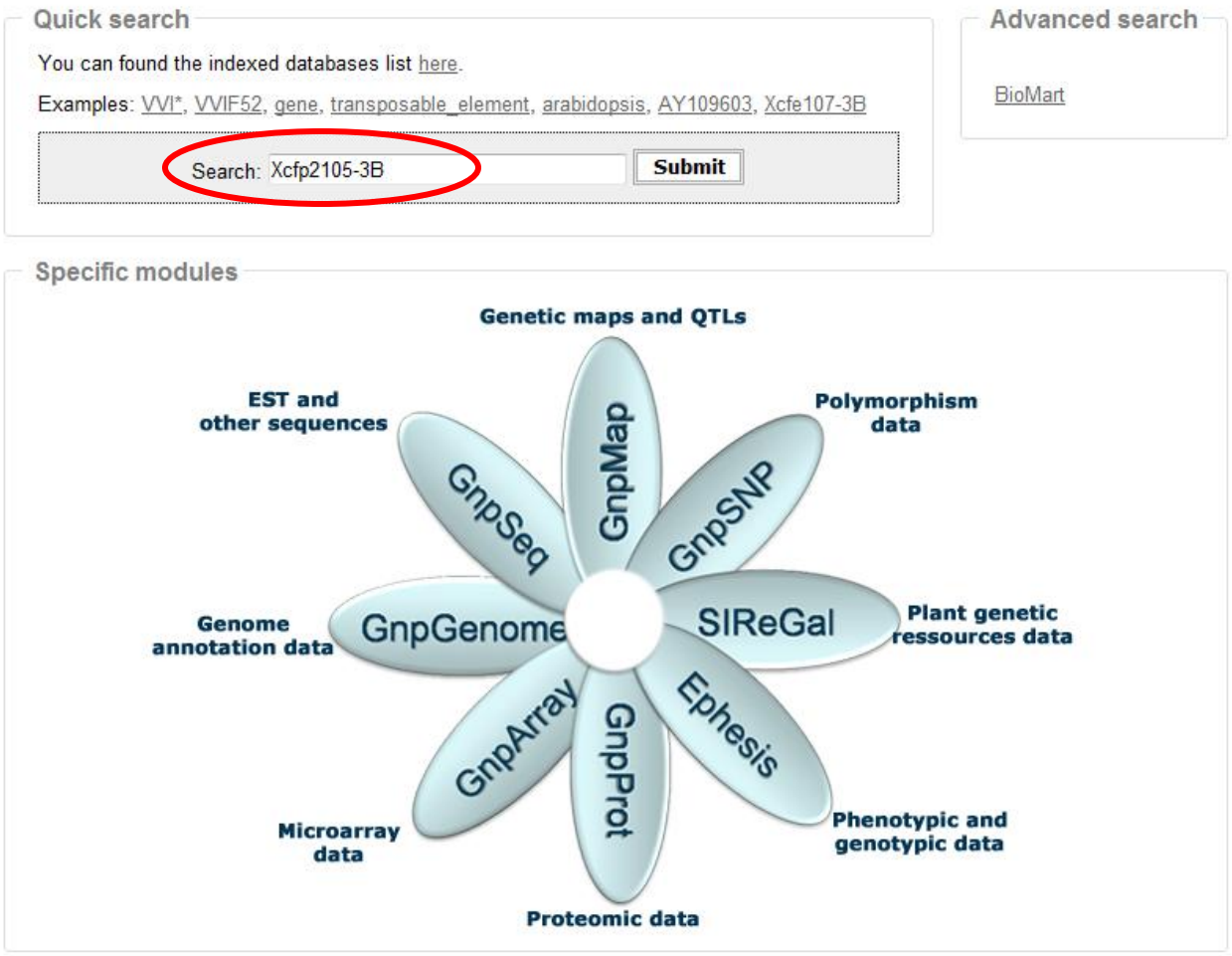
Interoperability

- New GnpIS Portal with tools to bridge genetic and genomic data
  - **Quick search**: google-like
  - **Advanced search**: biomart

http://urgi.versailles.inra.fr/gnpis/

Quick search

- Search for Xcfp2105-3B marker



Quick search

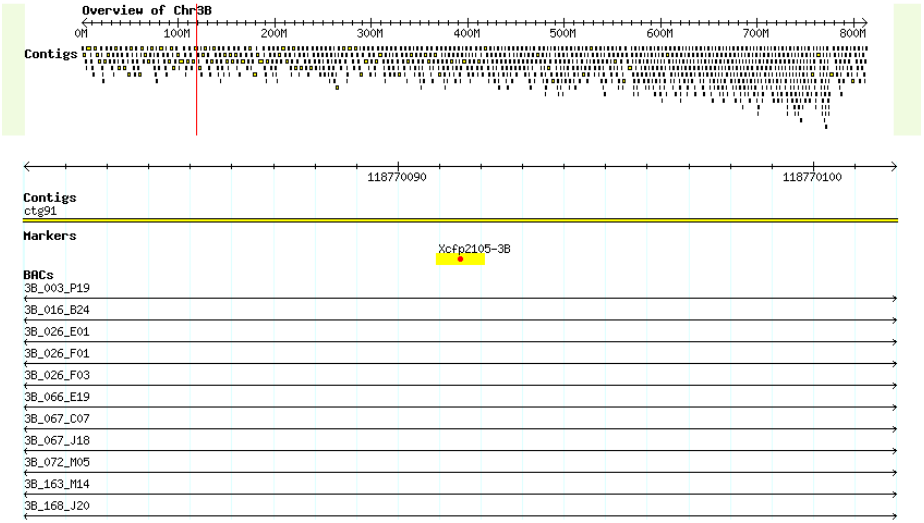
Results

Display 10 results per page
1 items found, displaying **1** to **1**

Query parameters: Xcfp2105-3B

Fgroup [genome] (1)	Locus [mapping] (1)
Xcfp2105-3B ★★★★	Xcfp2105-3B ★★★★

GnpGenome (physical map)



GnpMap (genetic map)

Locus details

Locus name :	Xcfp2105-3B
Marker name :	CFP2105
Marker type :	-
Gene function (manual annotation) :	-

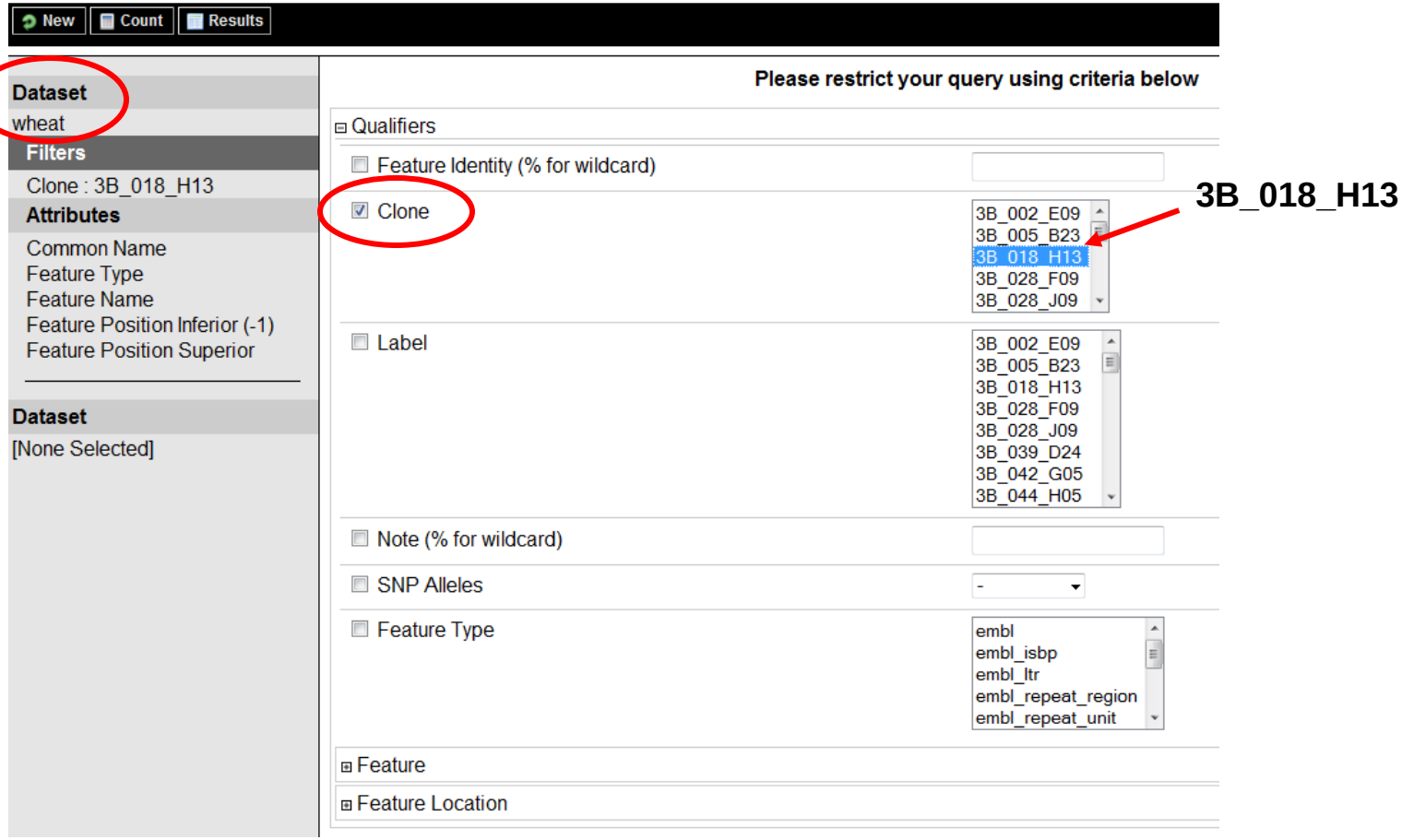
Assignments

Assignments number : 1

Map name	Reliability / (source map name)	Linkage group	Bin	Distance
Neighbour_080407	non_framework	3B	-	135.75

Biomart

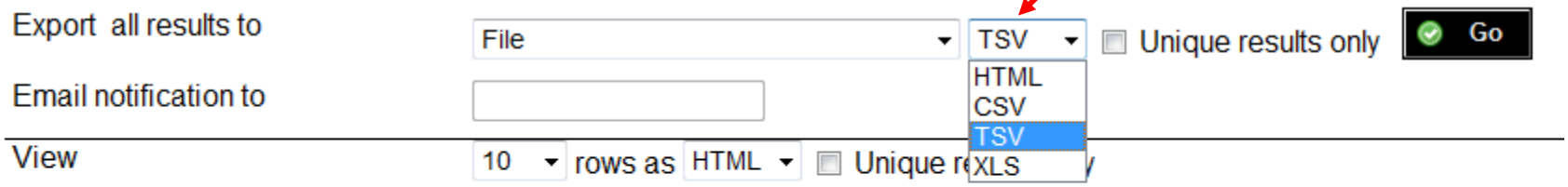
- Query on wheat BAC annotation database by clone name: 3B_018_H13



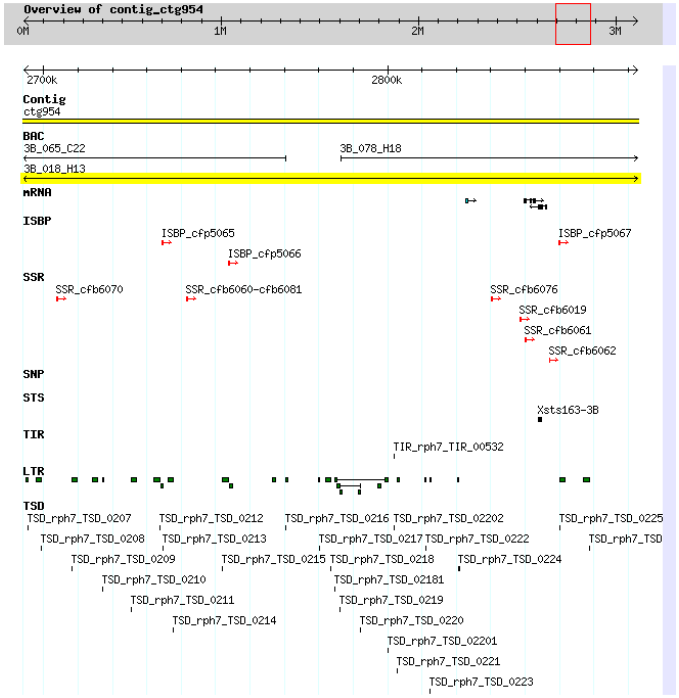
Biomart

- Result

Export to multiple formats

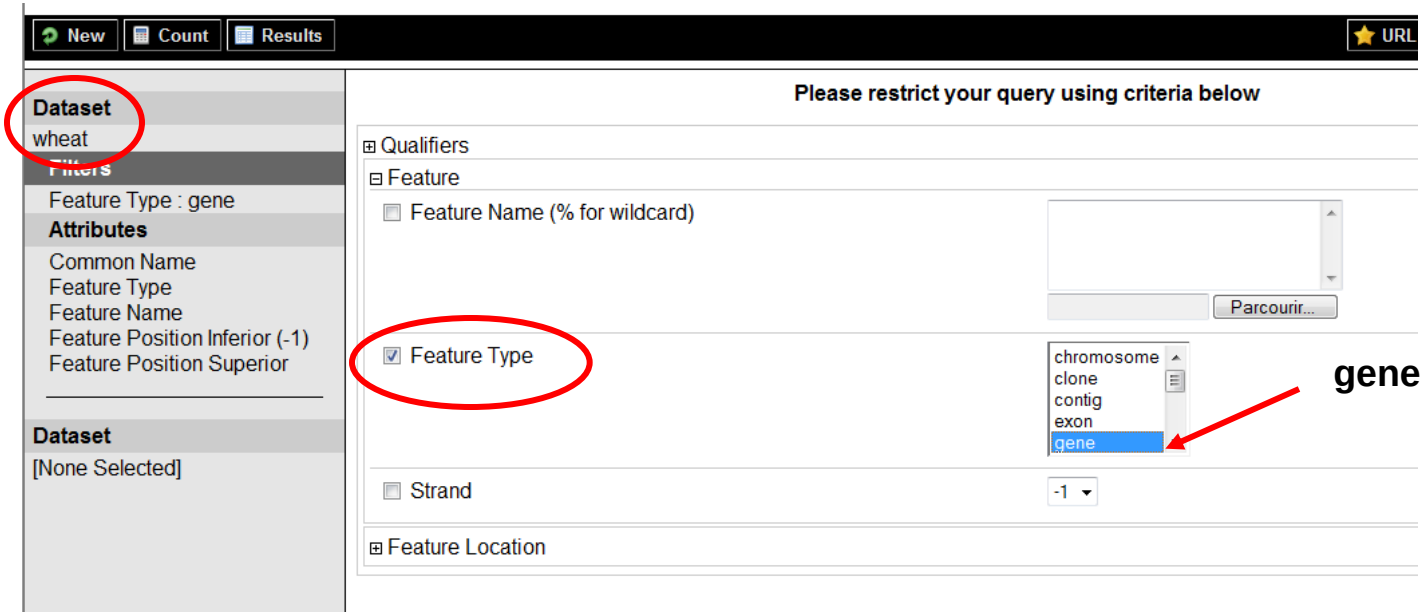


Common Name	Feature Type	Feature Name	Feature Position Inferior (-1)	Feature Position Superior
common wheat	clone	3B_018_H13	2694206	2872749



Biomart

- Query on wheat BAC annotation database: search all genes

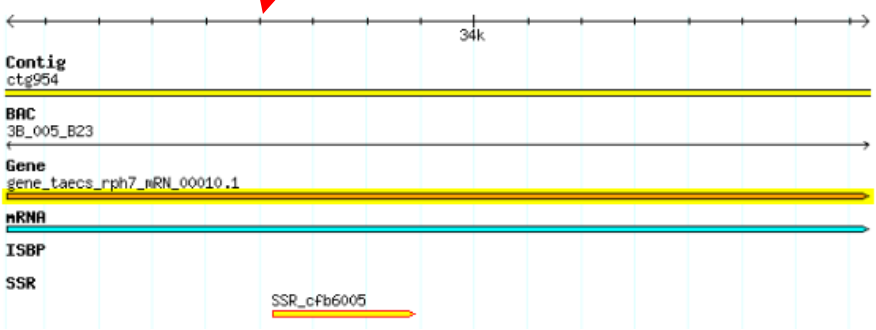


Biomart

- 10 first results

View 10 rows as HTML Unique results only

Common Name	Feature Type	Feature Name	Feature Position Inferior (-1)	Feature Position Superior
common wheat	gene	gene_taecs_rph7_mRN_00010.1	33127	34735
common wheat	gene	fna	40010	43000
common wheat	gene	gene_taecs_rph7_mRN_00030.1	72434	74048
common wheat	gene	gene_taecs_rph7_mRN_00040.1	89018	91796
common wheat	gene	gene_taecs_rph7_mRN_00050.1	259927	260647
common wheat	gene	gene_taecs_rph7_mRN_00060.1	279294	286788
common wheat	gene	gene_taecs_rph7_mRN_00070.1	329382	329691
common wheat	gene	gene_taecs_rph7_mRN_00080.1	362381	366777
common wheat	gene	gene_taecs_rph7_mRN_00090.1	419544	430586
common wheat	gene	gene_taecs_rph7_mRN_00100.1	504637	504951



Take-home messages

- 3B physical map browser with links to genetic mapping, SNP and BAC annotation data

  http://urgi.versailles.inra.fr/gbrowse/cgi-bin/gbrowse/Wheat_FPC/

- Friendly tools to query wheat data in GnpIS with the google-like interface and biomart tool

  http://urgi.versailles.inra.fr/gnpis/

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URGI

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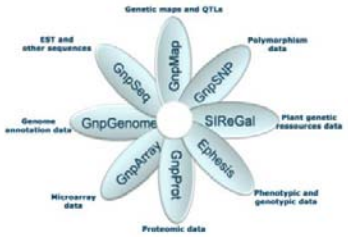

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