

Regulation of calcium and magnesium concentrations in leafy *Brassica*

Seosamh Ó Lochlainn



The University of
Nottingham



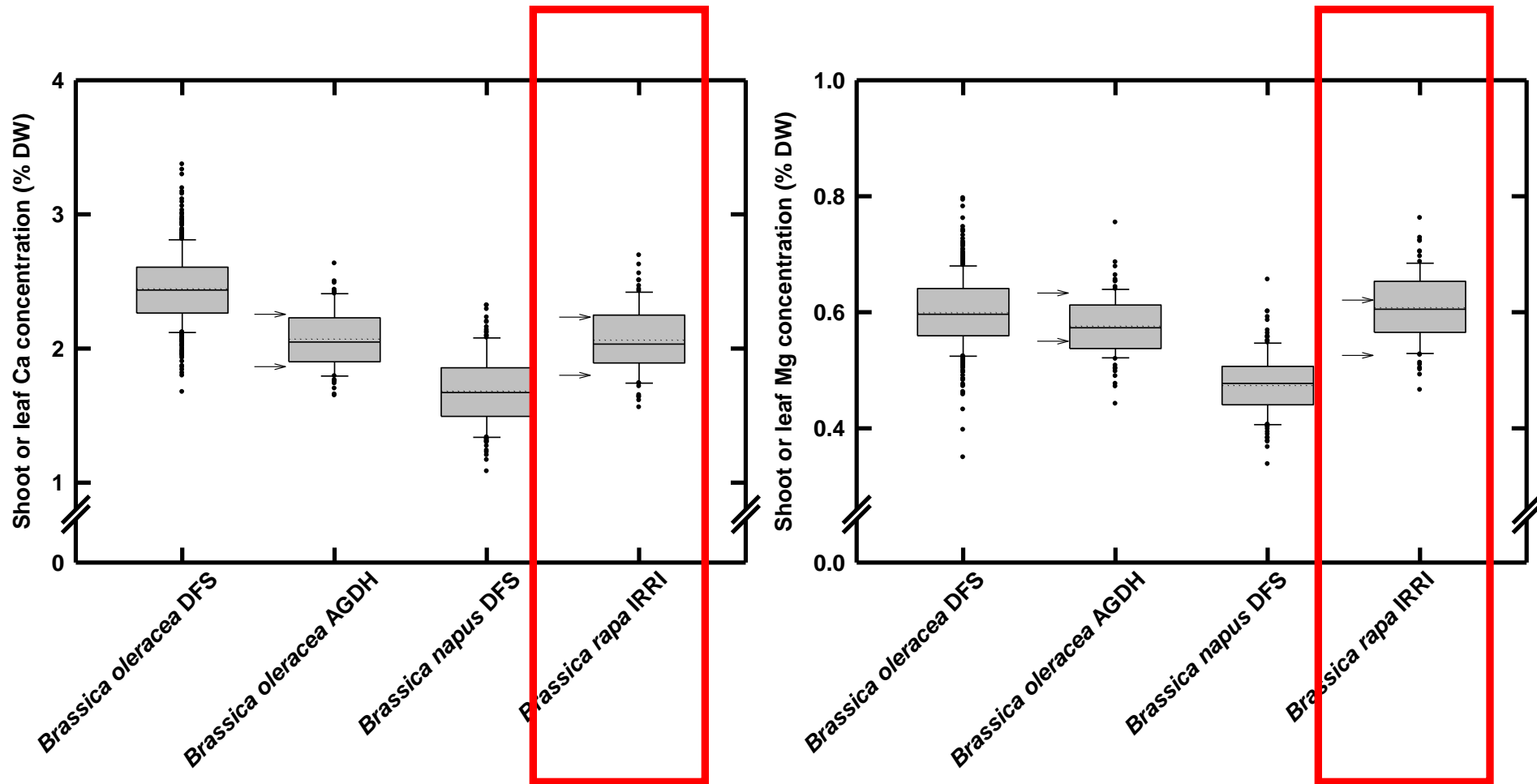
Aim

Identify genes affecting calcium (Ca) and magnesium (Mg) accumulation in leafy *Brassica*

Methods

- Comparative genomics
- *Brassica rapa* TILLing

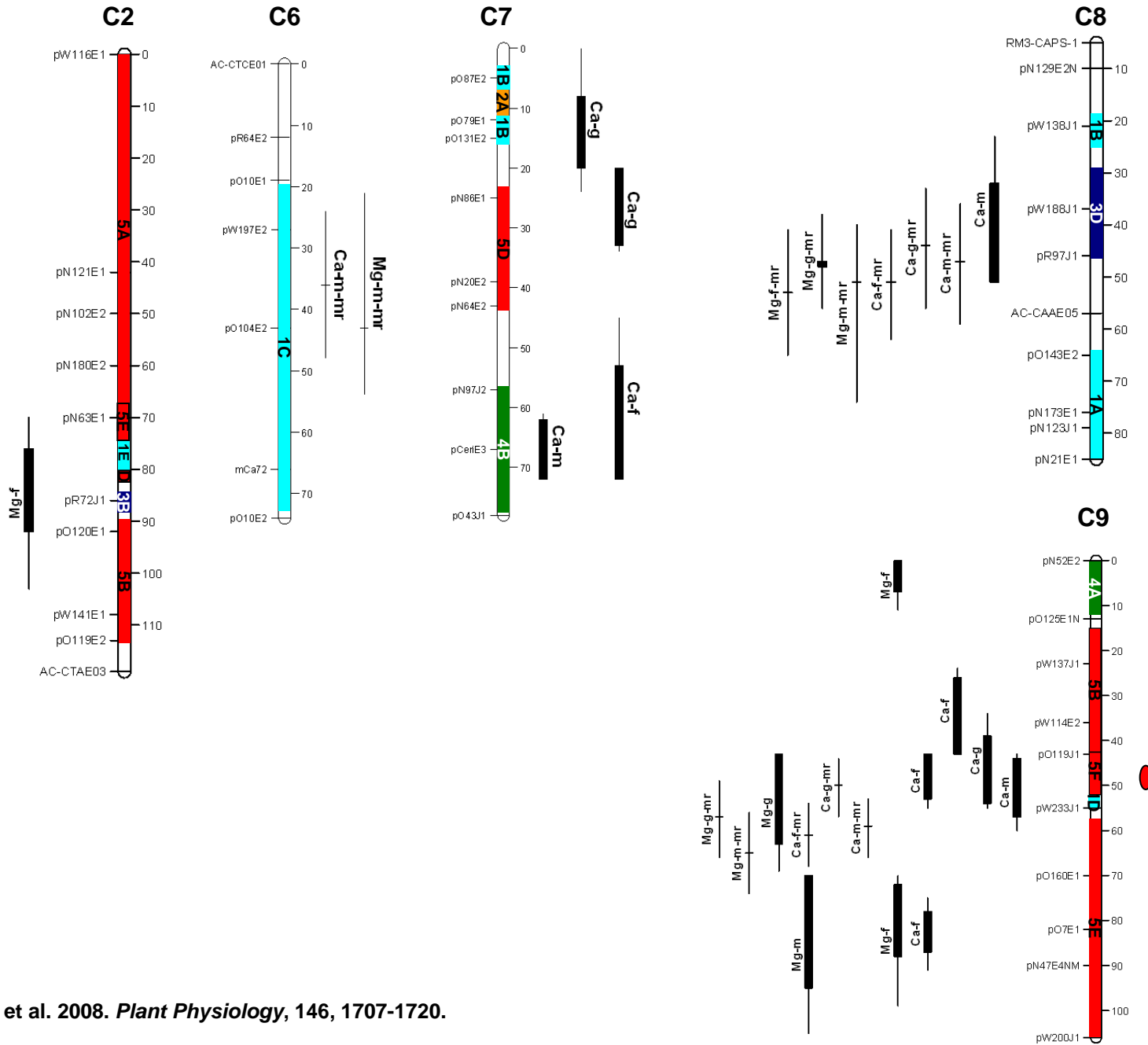
Variation in $[Ca]_{shoot}$ and $[Mg]_{shoot}$: A/C/AC Brassica



Broadley MR et al. 2008. *Plant Physiology*, 146, 1707-1720.

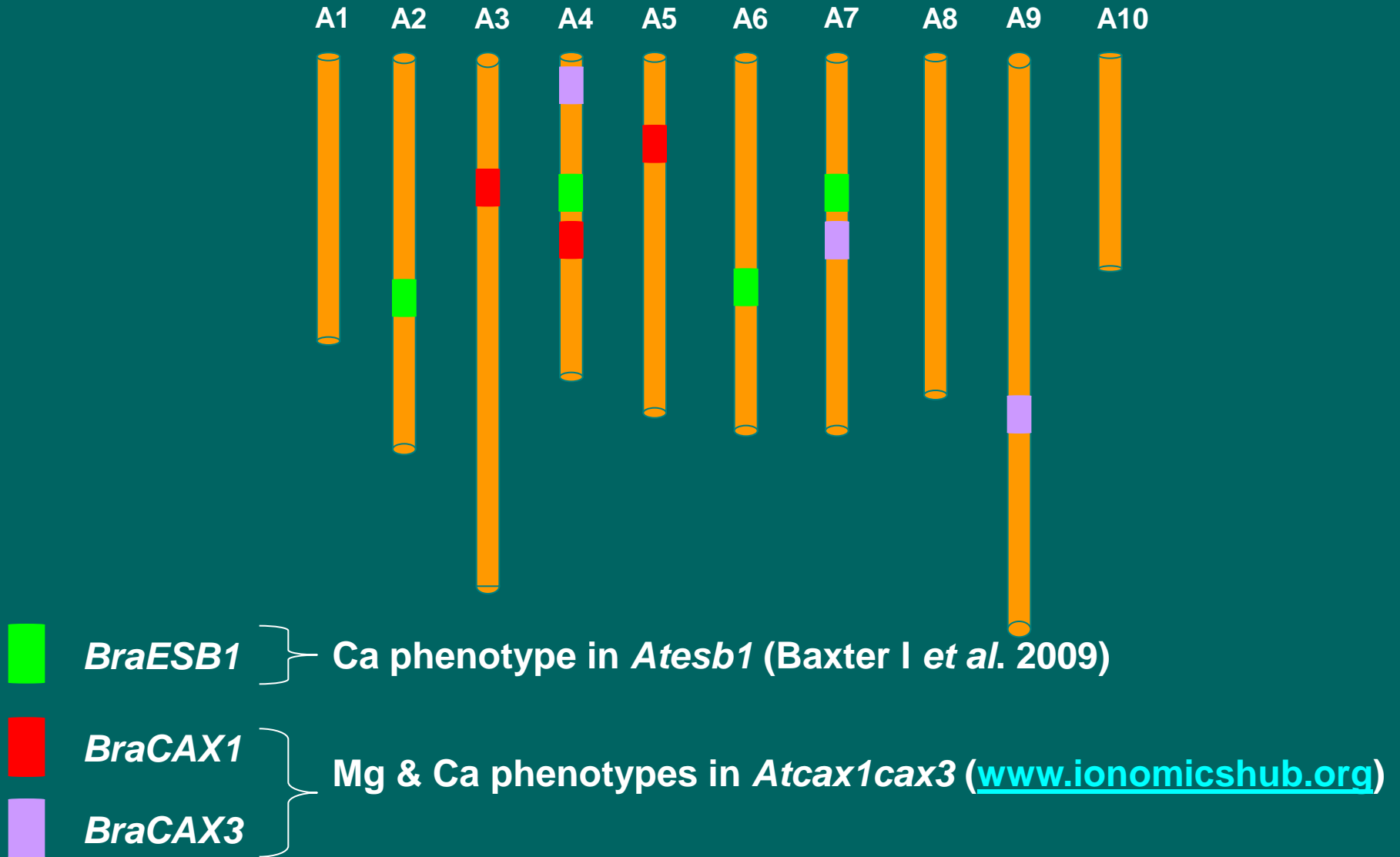
Broadley MR et al. 2009. *The Proceedings of the International Plant Nutrition Colloquium XVI*. Paper 1256.

C-Genome *Brassica*

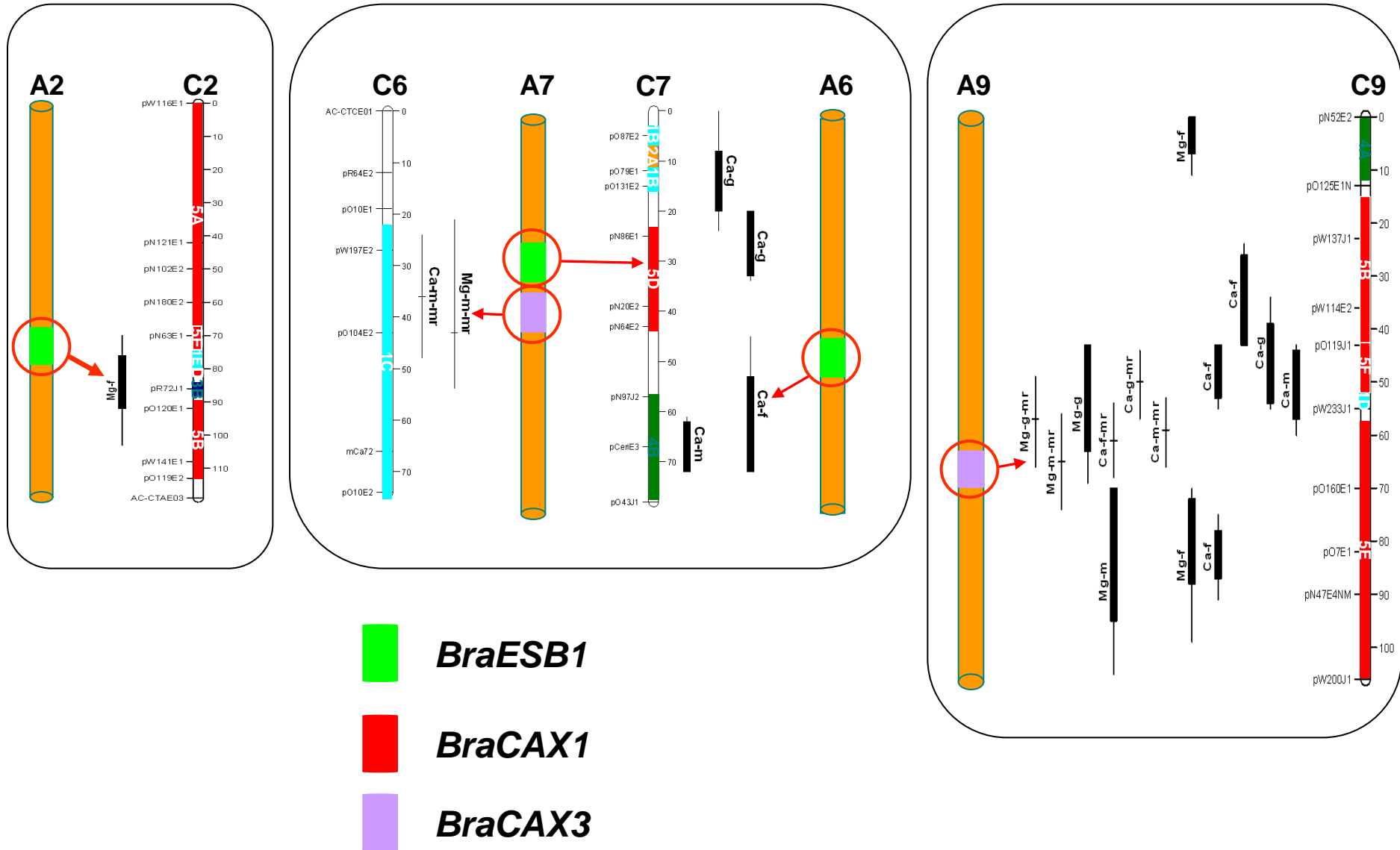


A-Genome *Brassica*

Brassica rapa 'Chiifu'



A-Genome *Brassica*



Further work in progress...

A-Genome *Brassica* – TILLING

Plate Position	Plant Name	Sequence of WT														Mutation Change	Het/Hom	Missense	Truncations		Silent		
		-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7		G/A or C/T	Coding Region	Stop	Splice Site	Non-Coding Region	No Change in AA
2:H11	JI30092-B	C	T	C	A	T	A	A	G	T	A	T	C	C	T	A	G/GA	HET				881G>GA	
2:B4	JI30061-B	T	A	A	G	T	A	T	C	T	G	T	T	T	T	T	C/CT	HET				860C>CT	
8:A3	JI30352-A	G	G	C	T	T	C	A	G	C	C	A	G	G	T	G	G/GA	HET	826G>GA:77S>S/N				
8:G3	JI30355-A	A	G	A	A	A	T	G	G	C	G	G	G	G	A	T	G/GA	HET				545G>GA	
4:E10	JI30183-A	G	A	G	A	G	C	T	G	A	G	A	C	A	T	G	G/A	HOM				626G>A:10L>L	
4:G10	JI30184-A	C	T	G	C	C	G	C	C	A	T	T	A	T	C	G	C/CT	HET				800C>CT:68A>A/A	
6:G12	JI30290-A	A	A	A	G	C	T	A	G	C	C	A	T	T	C	T	G/GA	HET	771G>GA:59A>A/T				
1:D2	JI30006-B	T	A	T	A	A	T	A	C	C	A	A	G	A	G	C	C/CT	HET				494C>CT	
5:B6	JI30214-B	A	A	A	C	A	T	A	G	C	T	T	T	C	A	T	G/GA	HET				517G>GA	
8:A7	JI30368-A	T	C	G	T	T	G	A	G	G	A	A	G	A	A	G	G/GA	HET	673G>GA:26R>R/K				
6:C11	JI30284-A	C	A	A	C	C	A	T	G	A	C	G	G	C	C	A	G/GA	HET	599G>GA:1M>M/I				
2:A9	JI30081-A	A	A	G	A	A	C	A	G	C	T	C	A	C	A	G	G/GA	HET	645G>GA:17A>A/T				
7:C5	JI30309-A	C	T	G	A	C	C	T	C	C	G	A	G	T	A	A	C/CT	HET					689C>CT:31L>L/L
14:F11	JI30690-B	T	T	T	C	T	C	T	C	T	A	A	T	C	T	C	C/CT	HET	736C>CT:47S>S/F				
10:H8	JI30472-B	C	A	T	A	C	C	T	G	C	C	G	C	C	A	T	G/GA	HET	795G>GA:67A>A/T				
16:E6	JI30766-A	G	A	A	G	G	T	T	C	C	A	T	A	C	A	A	C/CT	HET	708C>CT:38P>P/S				
14:E6	JI30669-A	C	T	G	A	C	C	T	C	C	G	A	G	T	A	A	C/CT	HET					689C>CT:31L>L/L
21:F4	JI31000-B	T	T	T	C	C	G	G	C	C	A	T	A	C	C	T	C/CT	HET	787C>CT:64A>A/V				
19:H2	JI30895-B	A	G	C	C	A	T	T	C	T	T	T	T	T	C	C	C/CT	HET	777C>CT:61L>L/F				
22:D12	JI31079-B	A	T	G	T	C	T	T	C	T	T	C	T	T	C	G	C/T	HOM	661C>T:22S>F				
18:C4	JI30853-A	A	G	C	A	T	G	T	C	T	T	C	T	T	C	T	C/T	HOM	658C>T:21S>F				
28:B3	JI31331-B	C	T	G	T	T	C	A	C	T	A	T	T	T	A	A	C/CT	HET				421C>CT	
29:C10	JI31408-A	G	A	A	C	A	G	C	G	T	T	C	A	A	A	A	G/GA	HET				926G>GA	
26:H9	JI31262-B	G	T	T	A	T	T	G	C	G	G	C	T	T	C	A	C/CT	HET					818C>CT:74C>C/C
25:B4	JI31191-B	A	G	A	G	T	T	T	C	T	C	T	C	T	A	A	C/T	HOM	732C>T:46L>F				
28:A11	JI31363-A	T	G	A	C	C	T	C	C	G	A	G	T	A	A	T	C/CT	HET		690C>CT:32R>R/X			

Mutant
Line

SNP site

Line
Zygoty

Protein
Truncations

Silent aa
changes

A-Genome *Brassica* – TILLING

- 19 M₃ and 30 M₂ *Bracax1* (n=149) being genotyped by Cleaved Amplified Polymorphisms markerS (CAPS) and sequencing.
- Backcross mutants with R-O-18 to clean background.
- Progeny analysed for mineral content through Inductively Coupled Plasma Mass Spectrometry (ICP-MS).



Acknowledgements



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Thank you