

Vegetable Genetic Improvement Network

<http://www2.warwick.ac.uk/fac/sci/lifesci/research/vegin/>

Brassica

(Also: Lettuce, Carrot, Onion)

Graham Teakle



Warwick Crop Centre, School of Life Sciences

THE UNIVERSITY OF
WARWICK

Crop Improvement in VeGIN

Increase range and accessibility of allelic variation

- Natural genetic variation - Diversity sets
- Induced genetic variation – TILLING mutant population

Understand the genetic basis of traits

- Identify new sources of desirable traits
- Map trait variation
- Map candidate genes for selected traits

Technology development

- Whole genome and transcriptome sequencing
- Marker development and high throughput genotyping (SNPs)
- Improved genetic maps and integration with genome sequence

Diversity sets at Warwick

Genebanks
 Warwick HRIGRU
 e.g. >6000 *Brassica*
 accessions
 Much genetic
 redundancy



**Diversity Foundation
 Sets (DFS)**
 Reference sample
 representing available
 diversity



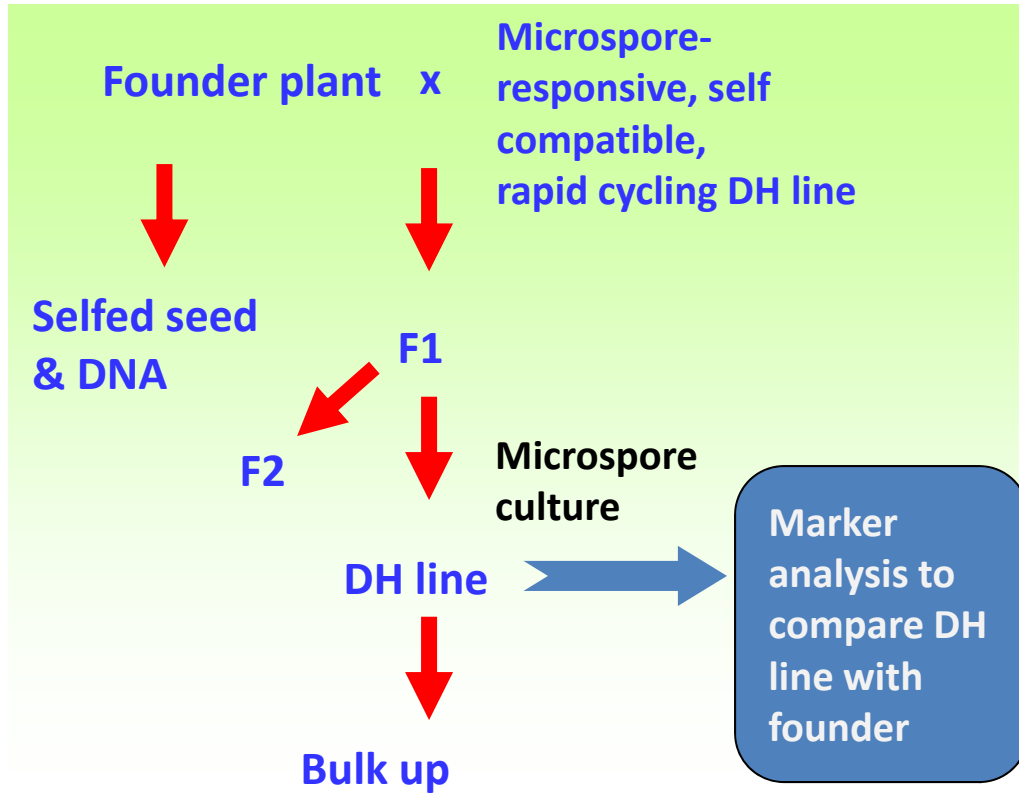
**Diversity Fixed
 Foundation Sets
 (DFFS)**
 Genetically homozygous
 (fixed) immortal lines

Species	No. founder lines	No. Fixed lines	Population type
<i>Brassica oleracea</i> (C genome)	376	140	DH
Wild species (C genome)	88	148	DH
<i>Brassica napus</i> (AC genome)	189	71	DH/Inbreeding
Lettuce	96	96	Inbreeding
Carrot	64 + 30 cvs	n/a	Half sib families
Onion	96	n/a	Half sib families



C genome species: BCgDFFS

89 Founder accessions from 14 species

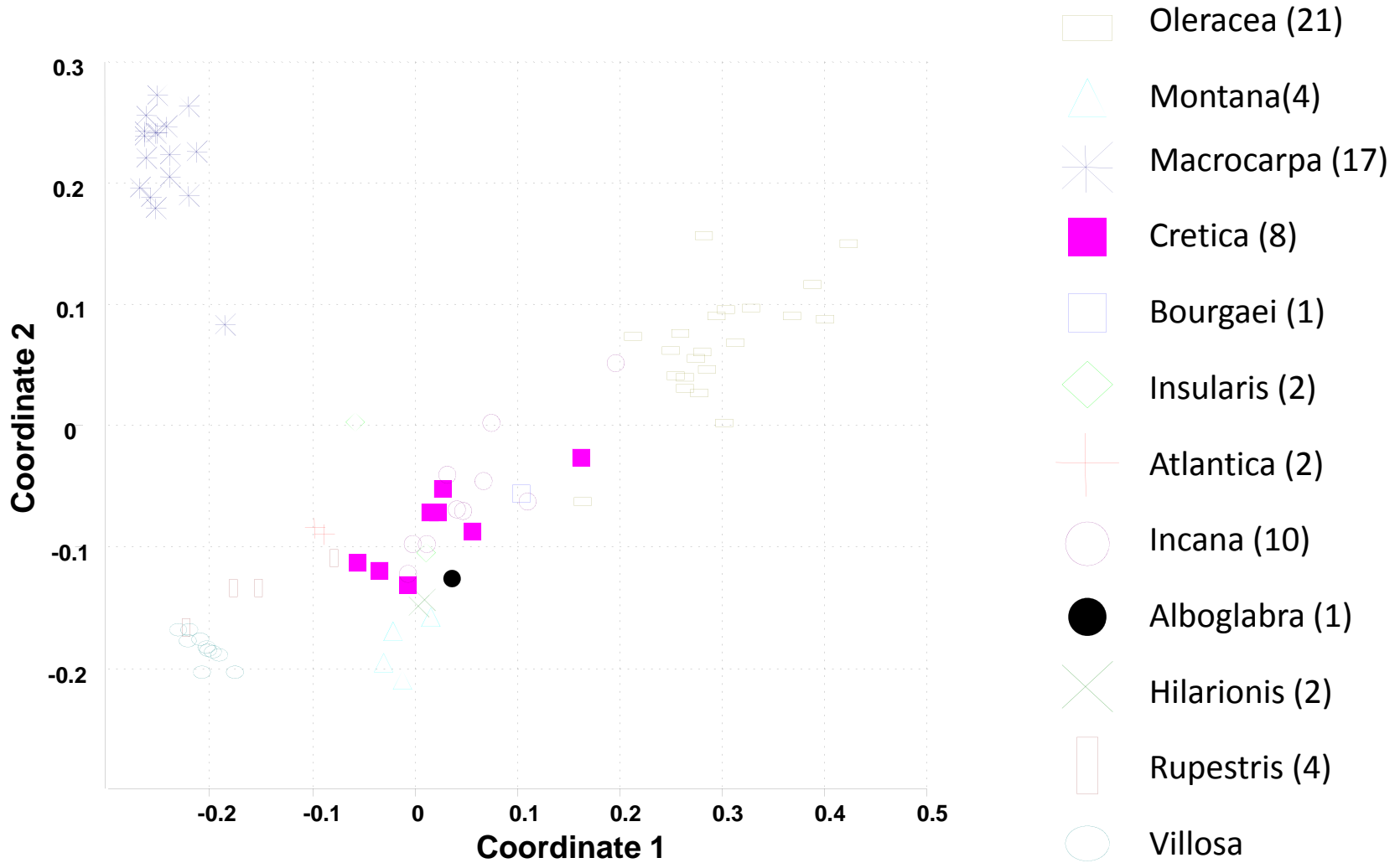


	Founder accessions	Accessions with DH lines	Total DH lines
<i>B. alboglabra</i>	1	1	20
<i>B. atlantica</i>	2	1	3
<i>B. balearica</i>	1	0	0
<i>B. bourgaei</i>	1	1	3
<i>B. cretica</i>	8	6	29
<i>B. hilarionis</i>	3	1	4
<i>B. incana</i>	10	5	22
<i>B. insularis</i>	2	1	2
<i>B. macrocarpa</i>	16	2	4
<i>B. maurorum</i>	1	0	0
<i>B. montana</i>	3	4	25
<i>B. oleracea</i>	24	12	32
<i>B. rupestris</i>	4	1	2
<i>B. villosa</i>	13	1	2

DH lines from 36 Founder accessions, 12 species



PCO analysis with 536 SNPs on the Wild *C* genome DFFS



Trait characterisation

- Screen for Turnip mosaic and Turnip yellows (C genome) virus resistance – John Walsh
- Use *TuRB01* to evaluate gene mining in DFFS – John Walsh
- Screen for Diamond Back Moth (*Plutella*) resistance – Rosemary Collier
- Nitrogen use efficiency in *B. oleracea* - Junwen Zou

Acknowledgements

University of Warwick

Project leader

Vicky Buchanan-Wollaston

Diversity sets

Graham Teakle

Francis Pitt

Sarah Stevenson

John Carder

Peter Walley

(Sandy McClement)

(Helen Mayne)

(Liz Bailey)

Genetic markers & genomics

Guy Barker

Jeanette Selby

(Rachel Edwards)

Virus resistance

John Walsh

Adam Baker

(Carol Jenner)

Entomology

Rosemary Collier

Marian Elliot

Nitrogen use efficiency

Graham Teakle

Junwen Zou

Harper Adams

David Pink

Paul Hand

