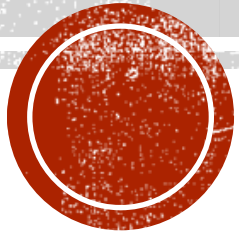
CAICE PROJECT WHEAT 2013 MET

Canberra, 17 March 2014



2013 MULTI-ENVIRONMENT TRIALS

- Trial sites: Edgeroi, Narrabri, Junee, Balaklava, Roseworthy, Mukinbudin, Toodyay
- ICARDA (ZIZ) – 122 lines selected from across the international nurseries
- CIMMYT (ZWB) – 50 lines from 46IBWSN
- CIMMYT (ZWW) – 24 lines from 31SAWSN
- Australian checks: Axe, Crusader, Gregory, Emu Rock, Gladius, Livingston, Mace, Magenta, Scout, Suntop and Yitpi
- CIMMYT/ICARDA Checks: Cham6, Dharwar Dry and WAXWING*2/
- Partially replicated, row column designs
- Unequal representation of lines across sites

2013 MULTI-ENVIRONMENT TRIALS

- Traits measured
  - Yield (t/ha)
  - Agronomic score (1-9)
  - Plant height (cm) – Toodyay
  - Zadoks – Roseworthy
  - Shattering and Lodging (1-9) – Roseworthy
  - Crown Rot and Head Tipping (1-9) – Edgeroi
- Analyses
  - Spatial analysis of each site – BLUEs and weights
  - Combined analysis of yield across-sites – BLUPs
  - Principal component analysis of Yield BLUPs for lines tested on all sites
  - Hierarchical clustering of Yield BLUPs for lines tested on all sites
- Data, BLUEs and BLUPs available on www.caigeproject.org.au

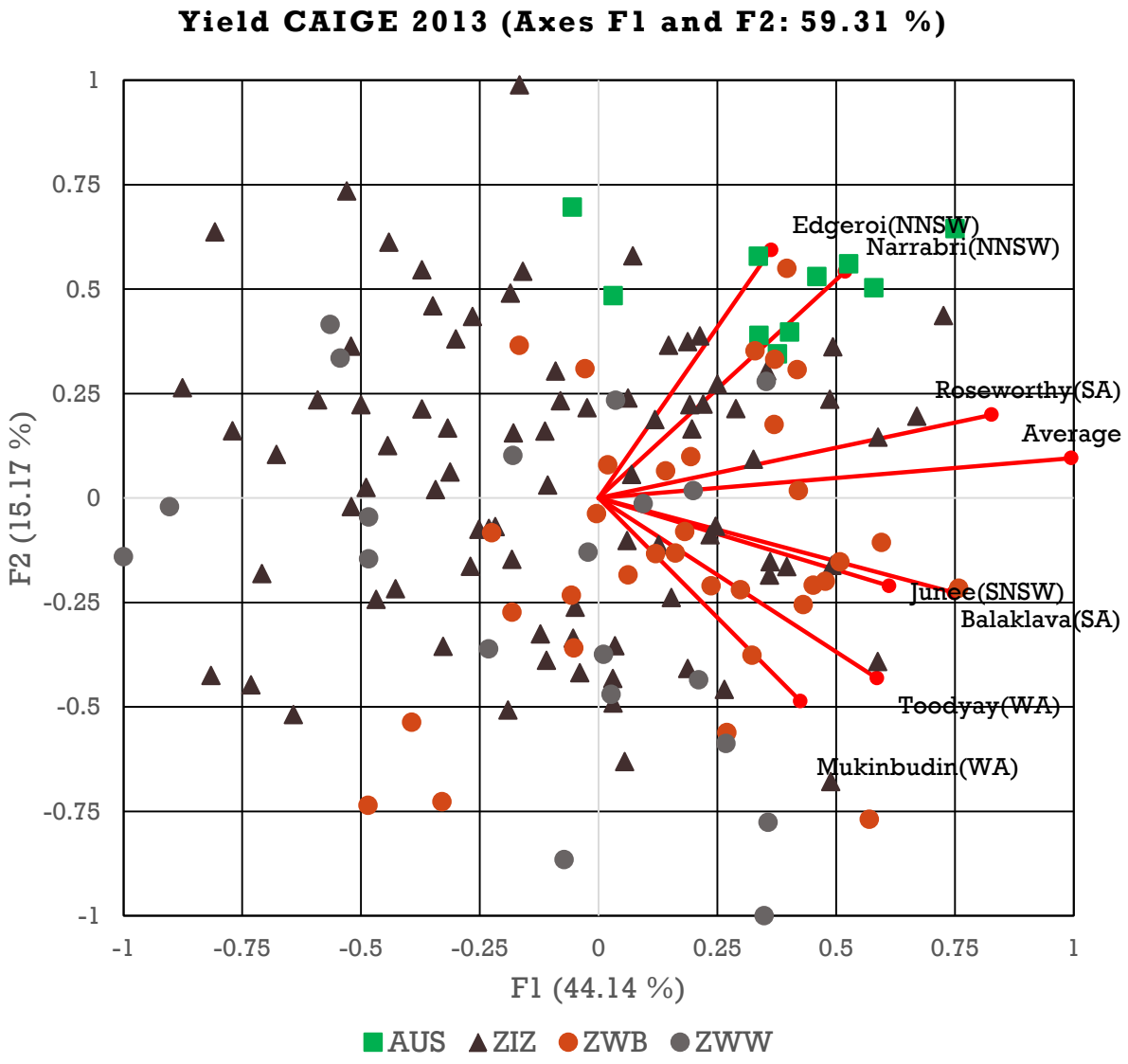
YIELD: SITE MEAN & RESIDUAL VARIANCE

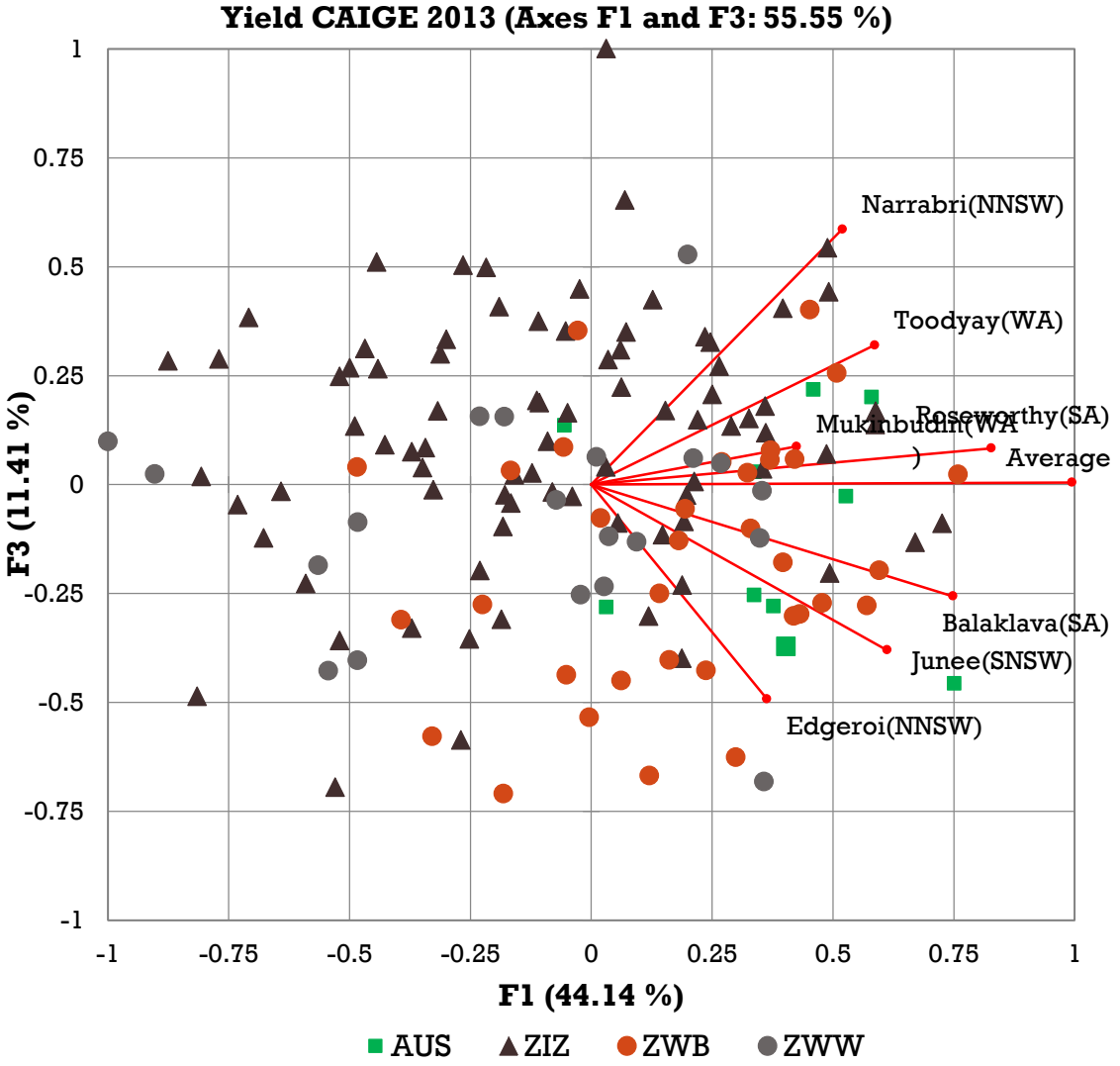
Site	Location	Mean	SE	Residual Variance
1	Balaklava	3.30	± 0.01	0.0382
2	Edgeroi	1.29	± 0.01	0.0376
3	Junee	3.49	± 0.02	0.1352
4	Mukinbudin	1.63	± 0.01	0.0520
5	Narrabri	2.59	± 0.02	0.0968
6	Roseworthy	3.40	± 0.02	0.0913
7	Toodyay	3.18	± 0.03	0.1400

Residual variance related to mean – Balaklava sites has low variance and high mean yield
Edgeroi site affected by crown rot
Two low yielding sites – Mukinbudin and Edgerton – mean yield less than two t/ha

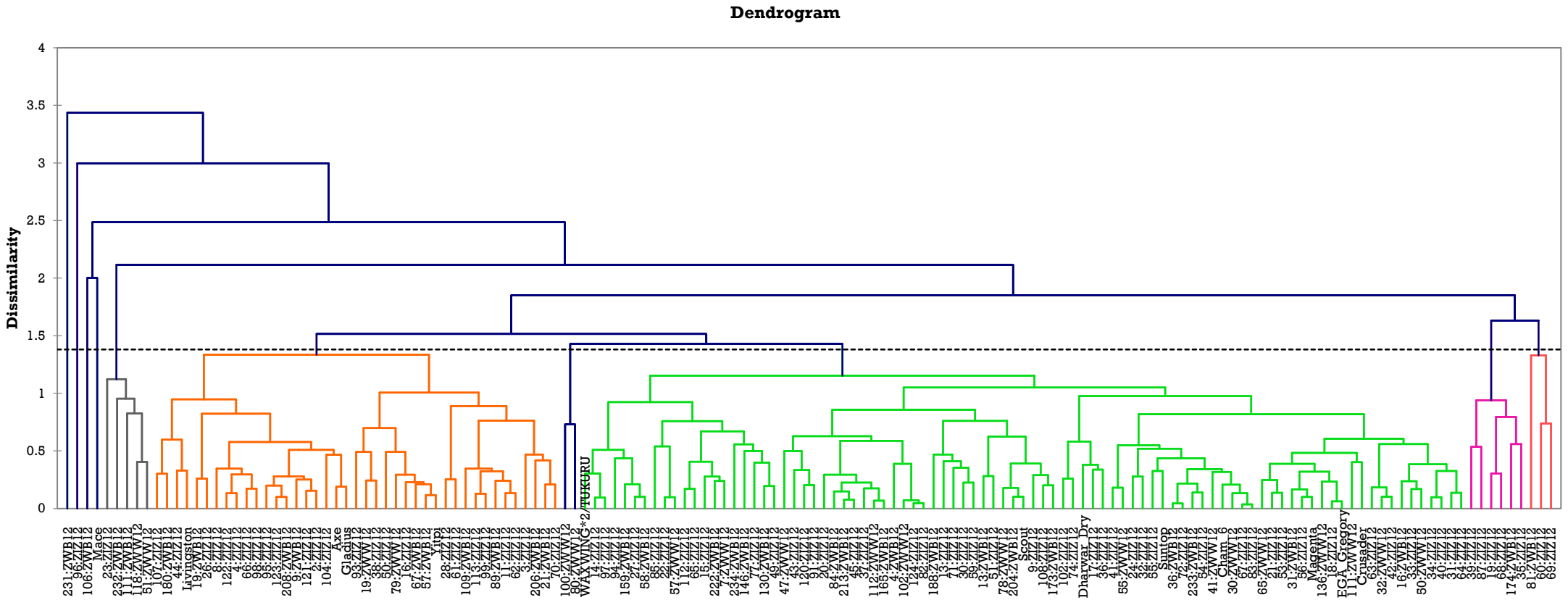
RESULTS: ACROSS-SITE ANALYSIS YIELD

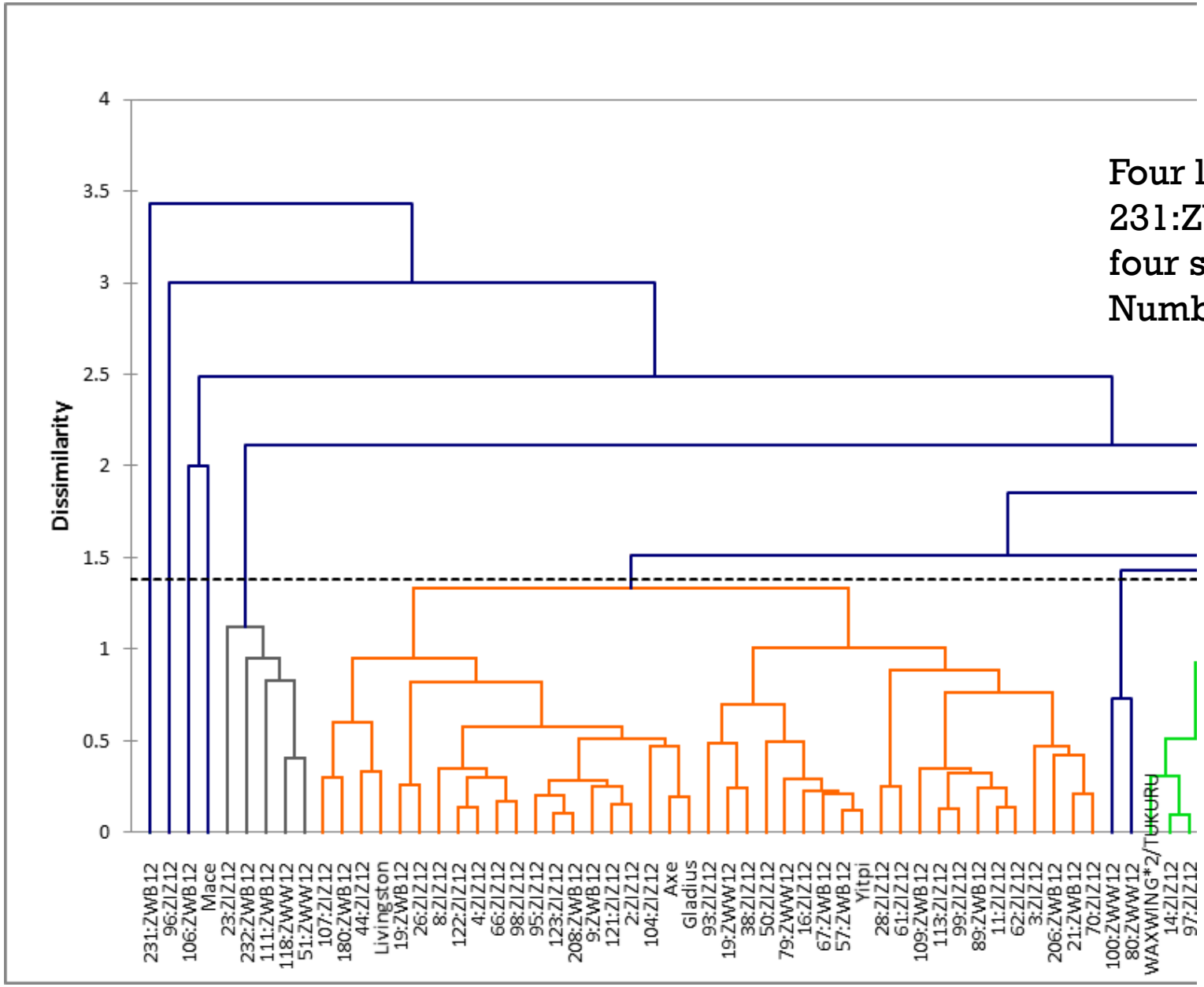
- Results displayed using biplots of first, second and third principal components
  - Vectors for each site, plus one for the average yield across sites
  - Lines grouped by source (ZIZ = ICARDA, ZWB = IBWSN, ZWW = SAWSN, AUS = Australian lines included as checks)
  - Includes only lines and checks evaluated on all sites


Yield CAIGE 2013 (Axes F1 and F2: 59.31 %)
Edgeroi(NNSW)
Narrabri(NNSW)
Roseworthy(SA)
Average
Junee(SNSW)
Balaklava(SA)
Toodyay(WA)
Mukinbudin(WA)
F2 (15.17 %)
F1 (44.14 %)
AUS ZIZ ZWB ZWW


Yield CAIGE 2013 (Axes F1 and F3: 55.55 %)
Narrabri(NNSW)
Toodyay(WA)
Roseworthy(SA)
Mukinbudin(WA)
Average
Balaklava(SA)
Junee(SNSW)
Edgeroi(NNSW)
F3 (11.41 %)
F1 (44.14 %)
AUS ZIZ ZWB ZWW

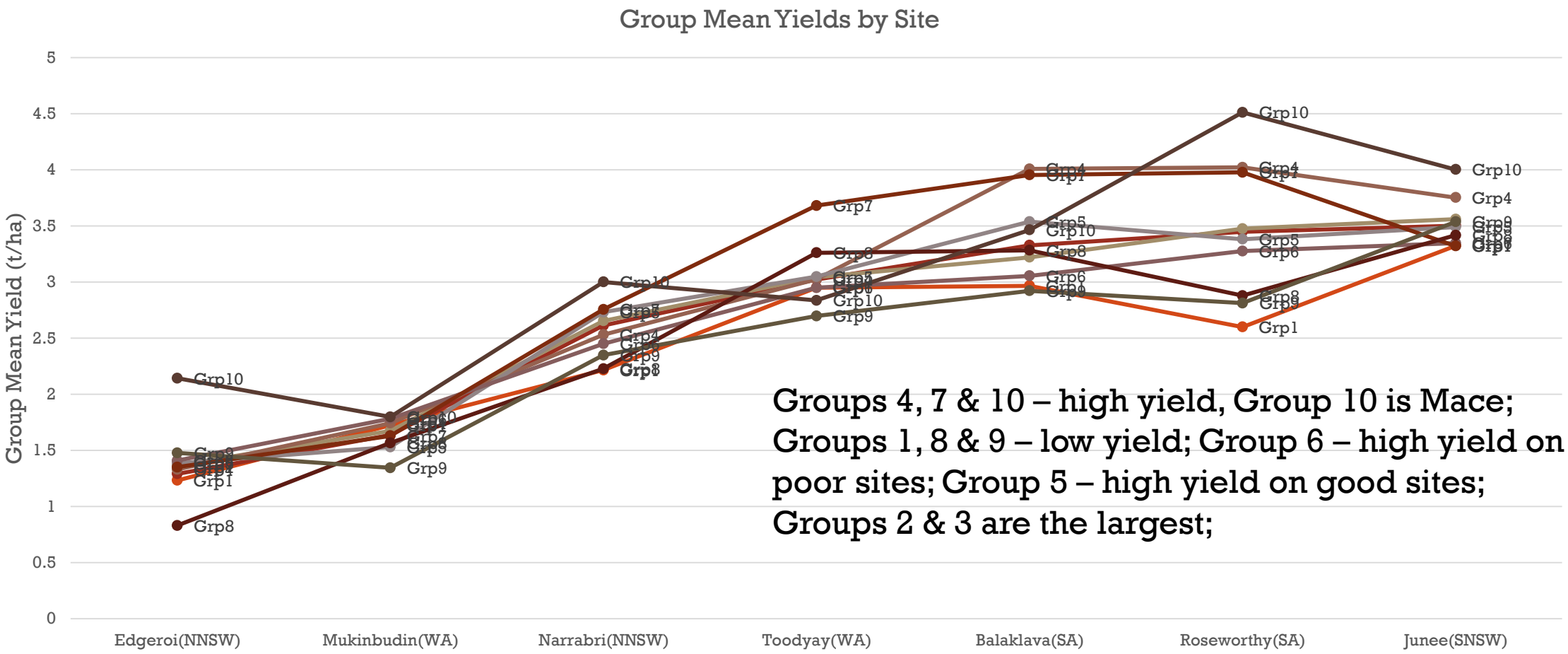
CLUSTERING – 10 GROUPS





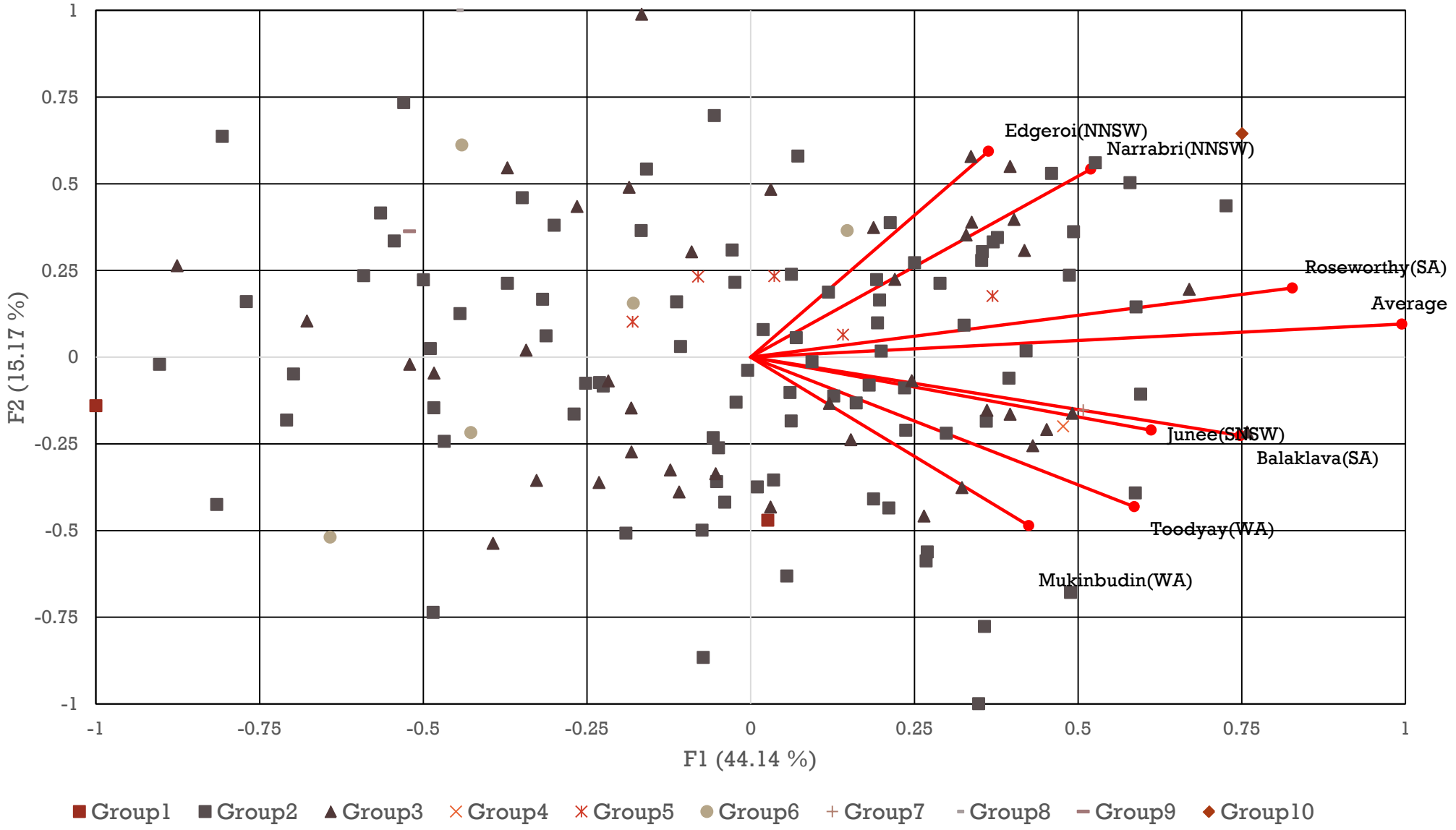
Four lines (Mace, 106:ZWB12, 231:ZWB12 and 96:ZIZ12) make up four separate groups.
Numbered 10, 4, 7 and 9 respectively

GROUP MEAN YIELD



Groups 4, 7 & 10 – high yield, Group 10 is Mace; Groups 1, 8 & 9 – low yield; Group 6 – high yield on poor sites; Group 5 – high yield on good sites; Groups 2 & 3 are the largest;

Group	AUS Checks	CIMMYT/ICARDA Checks	ZIZ	ZWB	ZWW	Totals
1					2	2
2	5	3	49	18	14	89
3	4		25	10	2	41
4				1		1
5			1	2	2	5
6			5	1		6
7				1		1
8			2	1		3
9			1			1
10	1					1
Totals	10	1	83	34	20	150

Gregory, Scout, Suntop, Crusader and Magenta in Group 2;
Axe, Gladius, Livingston and Yitpi in Group 3;
Mace is Group 10

Yield CAIGE 2013 (Axes F1 and F2: 59.31 %)