CAIGE Wheat

2015 MET Summary Report

2014 Trials

- Six sites:
  - Junee, Kalkee, Mukinbudin, Narrabri, Roseworthy and Toodyay
- Total of 268 lines
  - 148 ICARDA
  - 96 CIMMYT
  - 23 Australian
- Incomplete representation of lines across sites
  - 1 to 18 plots of test lines across 6 sites

Analysis

- Data changed to missing value where apparent outlier and where notes indicated incomplete plots (gaps)
- Generated heat maps of each site
- Single stage analysis in ASREML
- Adjusting for spatial effects in each trial: Row and Column, plus AR1 x AR1
- Site (fixed), Line (random) and Site x Line (random)

Summary

	Variance Components		H^2	Mean Yld (t/ha)
	Genetic	0.04721		
	GxE	0.04133		
Junee	Resid1	0.04301	0.36	2.7
Kalkee	Resid2	0.50325	0.08	6.8
Mukinbudin	Resid3	0.02962	0.40	1.6
Narrabri	Resid4	0.08076	0.28	4.7
Roseworthy	Resid5	0.06318	0.31	3.9
Toodyay	Resid6	0.14911	0.20	3.9

Mukinbudin (1.6t/ha)

Mukinbudin	1	2	3	4	5	6	7	8	9	10	11	12
1	1.81	2.14	1.78	1.74	1.99	2.38	1.98	2.50	2.14	2.35	2.23	2.56
2	1.34	1.31	1.21	1.46	1.19	1.72	1.94	1.58	2.10	2.16	1.81	1.97
3	1.56	1.86	1.38	1.96	1.35	2.11	1.73	2.03	2.12	1.53	1.79	1.98
4	1.94	1.41	1.48	1.86	1.51	1.61	1.63	1.95	1.80	1.91	1.55	1.93
5	1.31	1.71	1.27	1.60	1.62	1.40	1.97	1.83	2.47	1.91	1.20	1.31
6	1.67	1.21	1.83	1.56	1.33	1.43	1.24	1.61	1.84	2.16	1.66	1.40
7	1.14	1.80	1.46	1.50	1.30	1.45	1.62	2.01	1.75	1.61	1.93	1.77
8	1.53	1.55	1.83	2.57	1.53	1.09	1.85	2.07	1.77	2.25	1.93	1.23
9	1.46	2.05	1.95	1.50	1.48	1.87	2.04	1.54	2.48	2.94	1.77	1.61
10	1.54	1.29	1.45	1.72	1.64	1.98	1.75	1.85	1.80	1.79	2.09	1.77
11	1.48	1.22	1.68	2.02	1.38	1.94	1.94	1.88	1.83	1.38	1.62	1.66
12	1.61	1.91	1.59	1.60	1.25	1.65	2.20	2.11	1.97	1.68	2.09	2.29
13	1.80	1.10	1.70	1.63	1.62	1.47		1.76	1.54		1.41	1.47
14	1.25	1.35	1.45	1.14	1.53	1.24	1.83	1.49	1.45		1.29	1.95
15	1.27	1.28	1.85	1.41	1.80	1.71	1.85	1.93	1.63		1.80	1.38
16	1.74	1.36	1.90	1.78		1.52	2.03	2.35	2.07	1.83	1.66	1.25
17	1.41	1.32	1.72	1.95	1.64	2.26	2.32	1.38	1.61	2.05	1.30	1.10
18	1.17	1.32	1.78	1.60	1.57	1.58	1.55	1.69	1.13	1.54	1.20	2.27
19	1.59	1.59	1.60	1.59	1.39	1.83	2.39	1.87	1.97	1.86	1.71	1.78
20	1.27	2.28	2.35	1.37	1.73	1.42	1.89	1.59	2.05	1.61	1.52	1.50
21	1.22	2.08	1.38	1.52	1.27	1.34	1.73	2.11	1.90	2.15	1.02	1.39
22	1.78	1.51	1.68	1.23	1.23	2.12	1.95	1.65	1.40	2.14	1.67	1.64
23	1.27	1.54	1.69	1.41	1.38	1.76	1.74	1.42	1.23	1.58	1.33	1.28
24	1.79	1.89	1.70	2.29	1.78	2.09	2.06	2.01	2.31	2.01	1.73	1.68

Kalkee (6.8t/ha)

Kalkee	1	2	3	4	5	6	7	8	9	10	11	12
1	7.34	6.88	7.51	6.99	3.52	6.94	6.86	6.79	8.09	7.46	7.10	7.66
2	6.53	6.88	6.88	6.55	6.12	5.30	7.44	5.79	6.86	6.19	7.96	6.60
3	6.58	6.03	6.58	6.45	6.10	6.97	6.49	7.81	6.68	6.66	7.23	7.55
4	7.55	6.73	6.88	5.64	6.08	7.31	5.82	6.92	6.94	7.49	7.40	5.88
5	7.53	8.35	7.38	7.81	5.32	7.25	6.86	7.20	7.20	7.10	7.20	8.01
6	6.79	6.81	6.49	6.71	6.77	6.73	6.79	6.31	4.28	7.42	7.08	7.40
7	7.20	7.10	8.05	8.59	6.31	6.75	7.20	7.29	6.64	6.45	7.23	8.12
8	8.52	7.04	7.69	8.33	6.36	8.16	8.53	7.66	7.18	6.77	6.76	7.66
9	8.34	7.57	7.66	7.11	8.25	7.50	8.56	8.16	7.20	7.55	7.70	7.10
10	6.57	6.25	5.89	8.19	7.18	6.08	7.54	8.40	6.21	6.16	5.55	7.05
11	6.92	6.71	5.92	7.19	4.84	7.03	5.78	7.65	6.31	5.11	6.04	7.36
12	4.99	7.43	5.51	6.38	6.87	6.63	5.24	8.21	7.01	3.52	6.46	6.70
13	6.00	7.94	6.91	7.24	6.90	7.30	7.58	7.19	7.09	7.40	5.15	6.49
14	7.12	6.57	6.16	6.49	6.93	7.60	6.84	3.47	6.84	4.05	7.42	7.18
15	8.00	6.81	6.44	6.70	7.20	7.54	6.90	4.44	7.40	5.24	6.39	5.90
16	7.31	7.93	7.67	7.33	5.32	7.12	7.89	6.84	8.65	6.97	6.37	6.77

Toodyay (3.9t/ha)

Toodyay	1	2	3	4	5	6	7	8	9	10	11	12
1	3.14	3.65	4.08	3.37	4.81	4.07	4.23	4.67	3.90	3.98	4.35	3.01
2	3.74	4.21	4.70	3.73	4.28	4.47	4.48	4.50	3.60	4.29	2.91	3.01
3	3.74	4.20	3.88	4.26	4.57	4.68	3.99	4.62	3.98	3.79	3.54	2.90
4	4.15	4.61	4.11	4.61	3.58	4.49	4.30	4.03	4.14	4.17	3.08	3.57
5	4.40	4.32	4.52	3.94	4.63	3.87	4.73	4.17	3.84	3.49	3.05	3.70
6	4.83	4.66	4.34	4.31	4.54	3.81	4.48	4.13	4.05	3.71	3.60	3.32
7	4.00	4.52	4.53	4.92	4.22	4.42	4.58	4.08	4.51	3.84	3.69	3.58
8	4.25	4.44	4.60	4.19	4.79	4.09	4.54	4.04	4.41	4.10	2.75	3.22
9	4.27	4.40	3.60	4.38	4.95	4.39	4.23	4.47	3.94	3.94	3.79	4.10
10	3.99	4.39	3.88	4.42	4.11	4.09	3.94	3.54	3.69	3.66	4.01	3.93
11	4.17	4.26	3.96	4.60	4.74	4.22	4.41	4.37	4.38	3.79	3.52	3.13
12	4.45	5.05	3.43	4.70	4.43	3.78	4.05	3.44	4.35	3.85	3.47	3.23
13	3.77	3.87	4.33	4.09	4.31	3.48	4.17	4.18	3.68	4.26	3.78	3.68
14	3.55	4.70	3.93	4.39	4.32	4.50	4.11	3.14	3.79	3.20	3.61	3.38
15	3.73	4.27	3.41	3.46	4.42	3.95	4.37	3.40	3.58	3.68	3.48	3.64
16	4.02	4.44	3.99	3.87	4.34	3.80	4.04	3.56	3.56	3.35	3.61	3.43
17	4.14	3.96	3.60	4.21	3.84	3.45	3.39	3.29	3.52	3.79	3.56	3.91
18	3.97	3.68	4.11	4.28	4.28	3.67	3.81	3.23	4.02	4.24	3.83	5.07
19	4.31	4.28	4.38	3.99	3.43	3.21	3.14	2.87	3.89	4.08	4.02	4.82

Results

- Predicted means of all lines provided to Sandra (yesterday!) for upload to CAIGE website
  - Average across all sites
  - Mean yield at each site where tested (and data not missing)

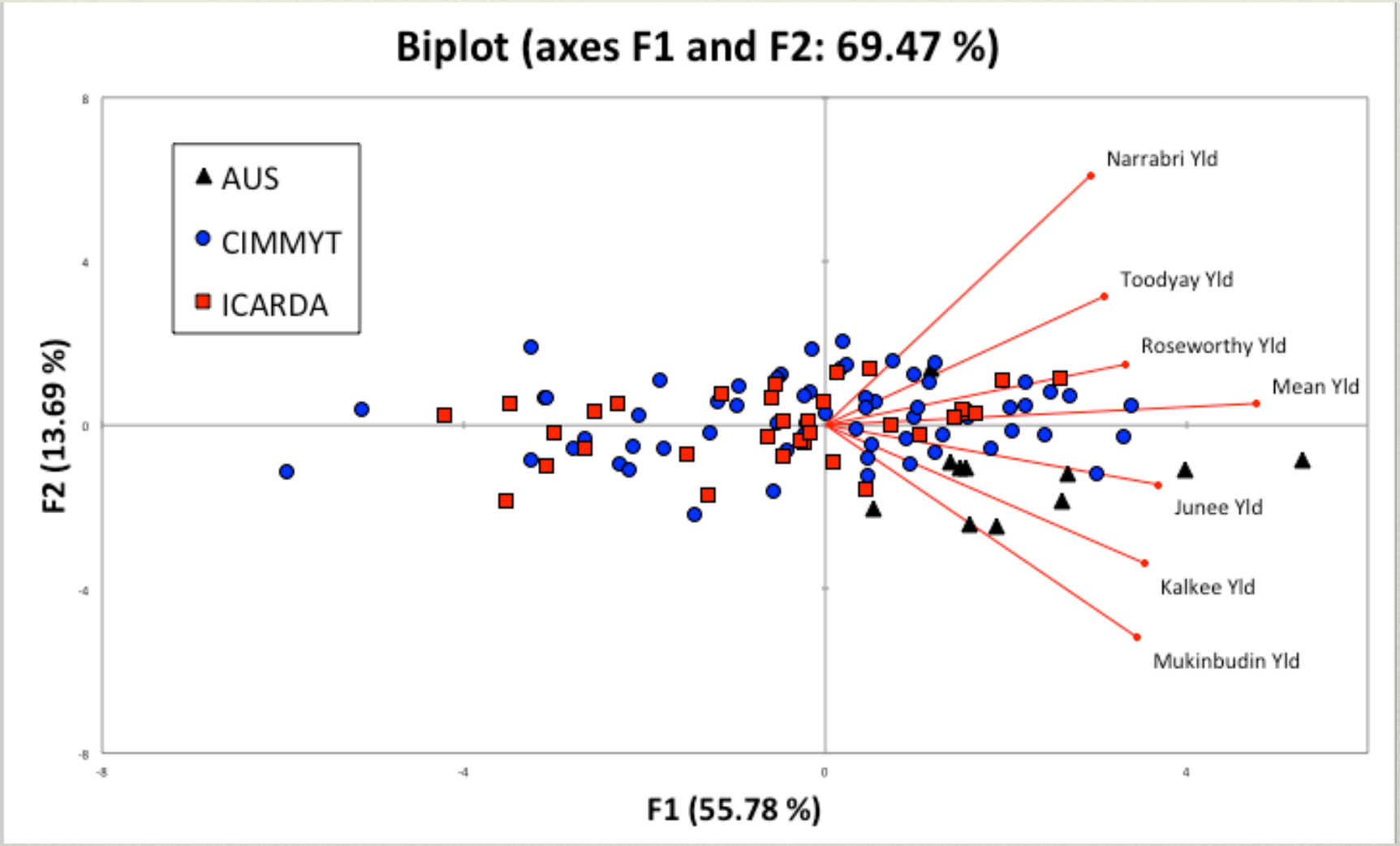
Analyses of Means

- For 108 lines evaluated on all six sites, using overall mean, and mean at each site:
  - Principal component analysis
  - Hierarchical clustering of line mean performance
  - Presented as biplots

Correlations Between Trials

	Mean Yld	Junee	Kalkee	Mukinbudin	Narrabri	Roseworthy	Toodyay
Mean Yld	**1**	0.750	0.674	0.706	0.631	0.711	0.664
Junee	0.750	**1**	0.537	0.510	0.393	0.356	0.375
Kalkee	0.674	0.537	**1**	0.565	0.330	0.381	0.285
Mukinbudin	0.706	0.510	0.565	**1**	0.130	0.404	0.343
Narrabri	0.631	0.393	0.330	0.130	**1**	0.390	0.374
Roseworthy	0.711	0.356	0.381	0.404	0.390	**1**	0.339
Toodyay	0.664	0.375	0.285	0.343	0.374	0.339	**1**

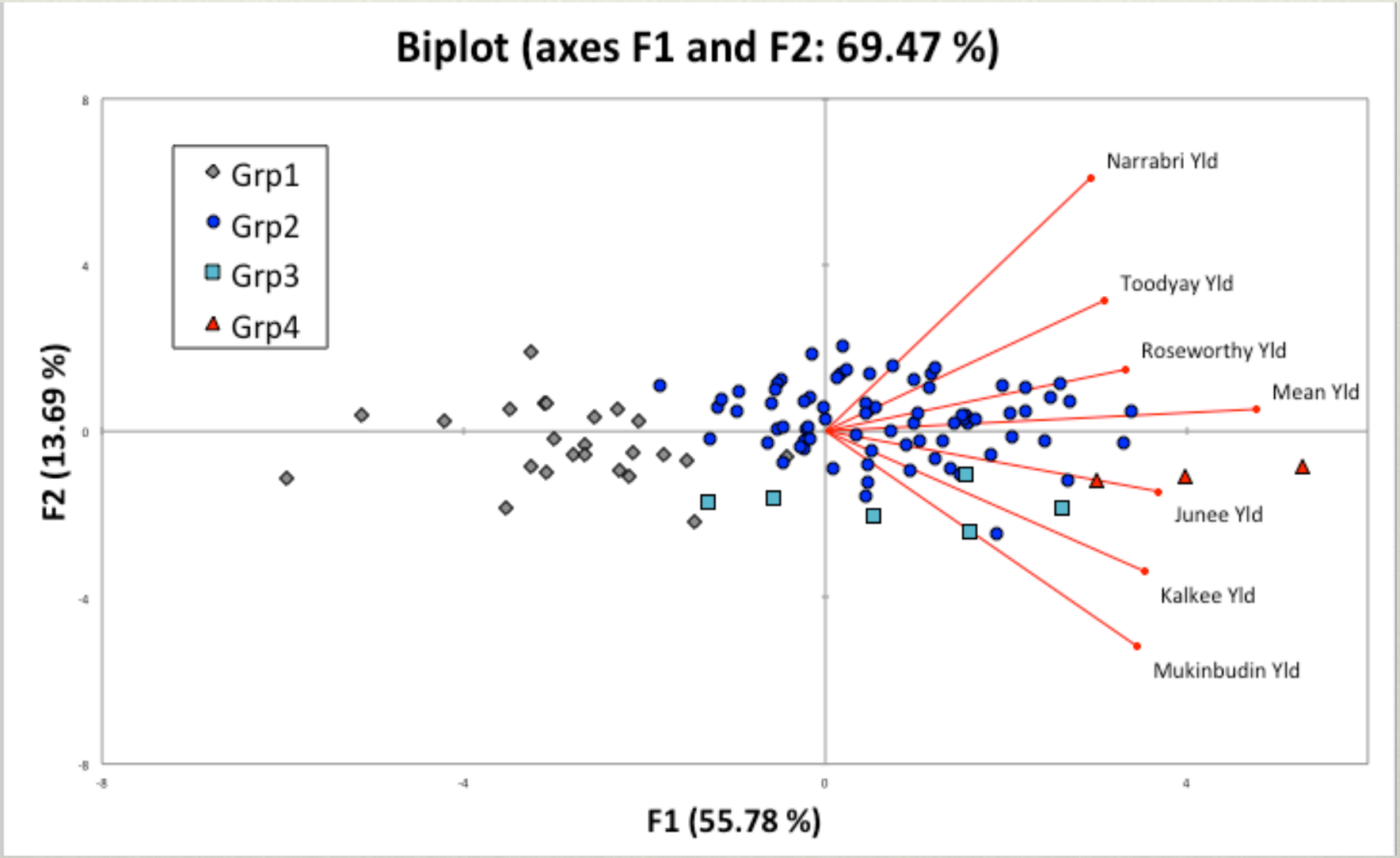
Biplot by Source



Clustering

- Smallest group (#4) includes only: Mace, Emu Rock and 56:ZWB13 (High yield across all trials)
- Next smallest group (#3) comprised: Axe, Gladius, Livingston and Suntop plus 47:ZIZ13 and 130:ZWB13 (poor at Toodyay)
- Next second largest group (#1) comprised the two CIMMYT checks (Dharwar Dry and Waxwing*2/Tukuru), and test lines that performed poorly on all sites.
- Final group (#2) included Gregory, Magenta, Crusader, Scout and Yipti plus ICARDA check Cham_6

Biplot - Groups



Some Promising Lines…

Entry	Line	Pedigre	Nursery	Group	Mean Yld
19	23:ZIZ13	TINAMOU-2//TEVEE-1/SHUHA-6	ICARDA	2	4.09
23	27:ZIZ13	KAUZ/PASTOR/3/ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA	ICARDA		4.24
24	28:ZIZ13	KAUZ/PASTOR/3/ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA	ICARDA		4.13
65	72:ZIZ13	SHUHA-4/FLORKWA-4//HUBARA-3	ICARDA		4.20
70	77:ZIZ13	HUBARA-3*2/SHUHA-4	ICARDA	2	4.32
96	106:ZIZ13	HUBARA-3*2/SHUHA-4	ICARDA	2	4.22
97	107:ZIZ13	HUBARA-3*2/SHUHA-4	ICARDA	2	4.17
136	148:ZIZ13	HUBARA-15/CATBIRD//PASTOR-2	ICARDA	2	4.16
150	28:ZWB13	KACHU//KIRITATI/2*TRCH	CIMMYT		4.23
157	40:ZWB13	PFAU/SERI.1B//AMAD/3/WAXWING/4/QUAIU #2	CIMMYT	2	4.27
164	56:ZWB13	CHONTE//KIRITATI/2*TRCH	CIMMYT	4	4.34
166	68:ZWB13	VILLA JUAREZ F2009/DANPHE #1	CIMMYT		4.30
193	170:ZWB13	QUAIU #1/5/KIRITATI/4/2*SERI.1B*2/3/KAUZ*2/BOW//KAUZ/6/BECARD	CIMMYT	2	4.40
194	171:ZWB13	QUAIU/BECARD//BECARD	CIMMYT	2	4.26
197	175:ZWB13	FRET2*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ/5/KIRITATI/2*TRCH/6/BAJ #1	CIMMYT	2	4.41
205	197:ZWB13	ND643/2*WBLL1//KIRITATI/2*TRCH/3/ND643/2*WBLL1	CIMMYT	2	4.23
223	266:ZWB13	GLADIUS/3/2*KA/NAC//TRCH	CIMMYT	2	4.20
224	267:ZWB13	RAC 1192/4/2*ATTILA/3/WEAVER*2/TSC//WEAVER	CIMMYT	2	4.16

Future

- Samantha (Sam) Nolan – undertaking a comprehensive review of yield in the CAIGE wheat trials over last 5 years (honours research project)
- Factor Analytic modeling of GxE
- Incorporation of pedigree information
- Expect to be completed by mid-2015
- Design and analysis of CAIGE wheat trials to be conducted by SAGI from 2015 onwards