Tutorial on using the Matrix crossing design

A common design for crossing maize is to lay out the crossing block in a rectangular array with male lines in the first column and several columns of female lines adjacent. The breeder then takes pollen from the make line across all the females in the row.

For example the following array shows the 32 entries assigned to the array for plots.

Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
1	23	17	19	7	14	22
Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14
2	9	20	32	21	23	15
Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21
2	26	20	12	31	28	8
Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28
3	15	27	25	30	7	21
Plot 29	Plot 30	Plot 31	Plot 32	Plot 33	Plot 34	Plot 35
4	31	10	16	12	30	10
Plot 36	Plot 37	Plot 38	Plot 39	Plot 40	Plot 41	Plot 42
5	24	20	8	27	29	13
Plot 43	Plot 44	Plot 45	Plot 46	Plot 47	Plot 48	Plot 49
6	11	23	12	16	18	19

The first column contains the male lines and the remaining columns contain the female lines. Male rows can be duplicated and female entries can be duplicated within and across rows as desired. A final column of plots repeating column one is sometimes added and planted slightly later than column 1 to facilitate nicking.

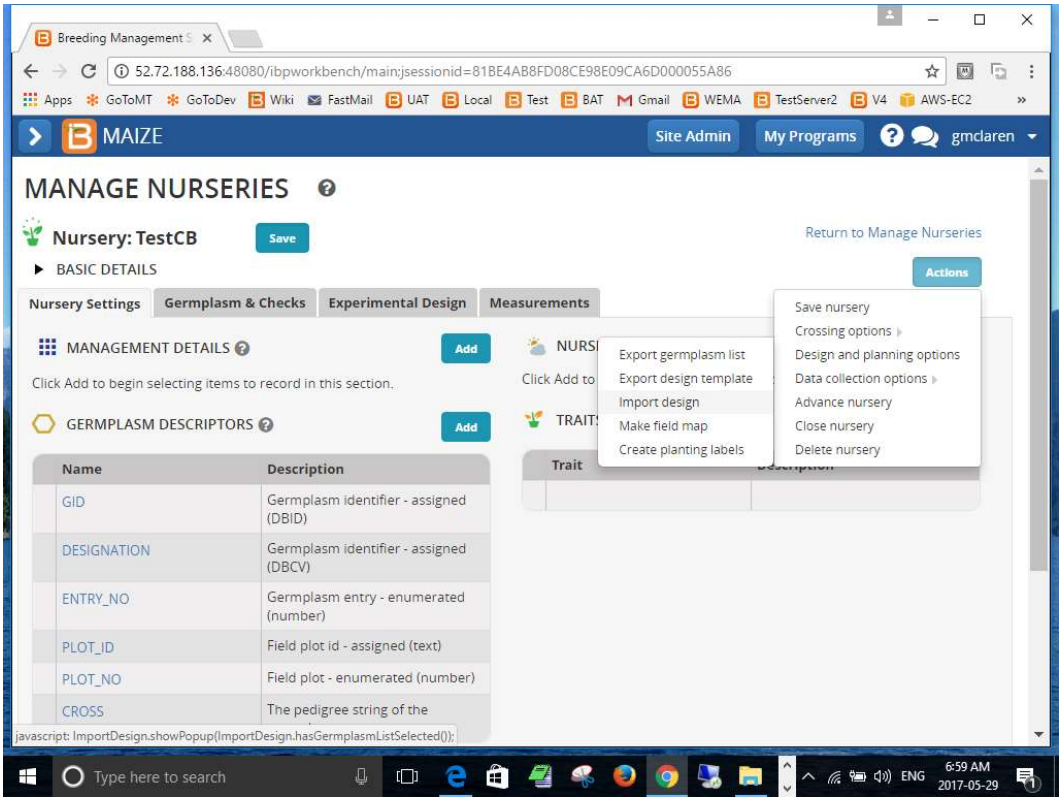
The first step to using BMS to facilitate this design is to create a crossing block nursery containing the 32 distinct parents. Next, the above design is prepared in a design template csv file.

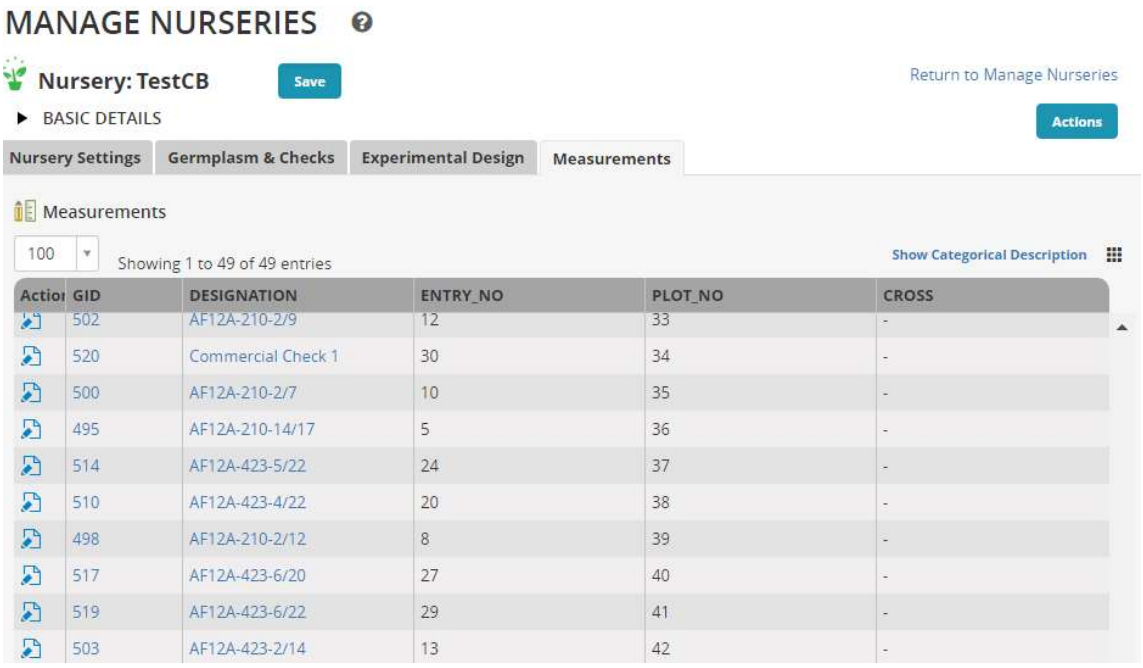
TRIAL_INSTANCE	ENTRY_NO	PLOT_NO
1	1	1
1	23	2
1	17	3
1	19	4
1	7	5
1	14	6
1	22	7
1	2	8
1	9	9
1	20	10
1	32	11
1	21	12
1	23	13

1	15	14
1	2	15
1	26	16
1	20	17
1	12	18
1	31	19
1	28	20
1	8	21
1	3	22
1	15	23
1	27	24
1	25	25
1	30	26
1	7	27
1	21	28
1	4	29
1	31	30
1	10	31
1	16	32
1	12	33
1	30	34
1	10	35
1	5	36
1	24	37
1	20	38
1	8	39
1	27	40
1	29	41
1	13	42
1	6	43
1	11	44
1	23	45
1	12	46
1	16	47
1	18	48
1	19	49

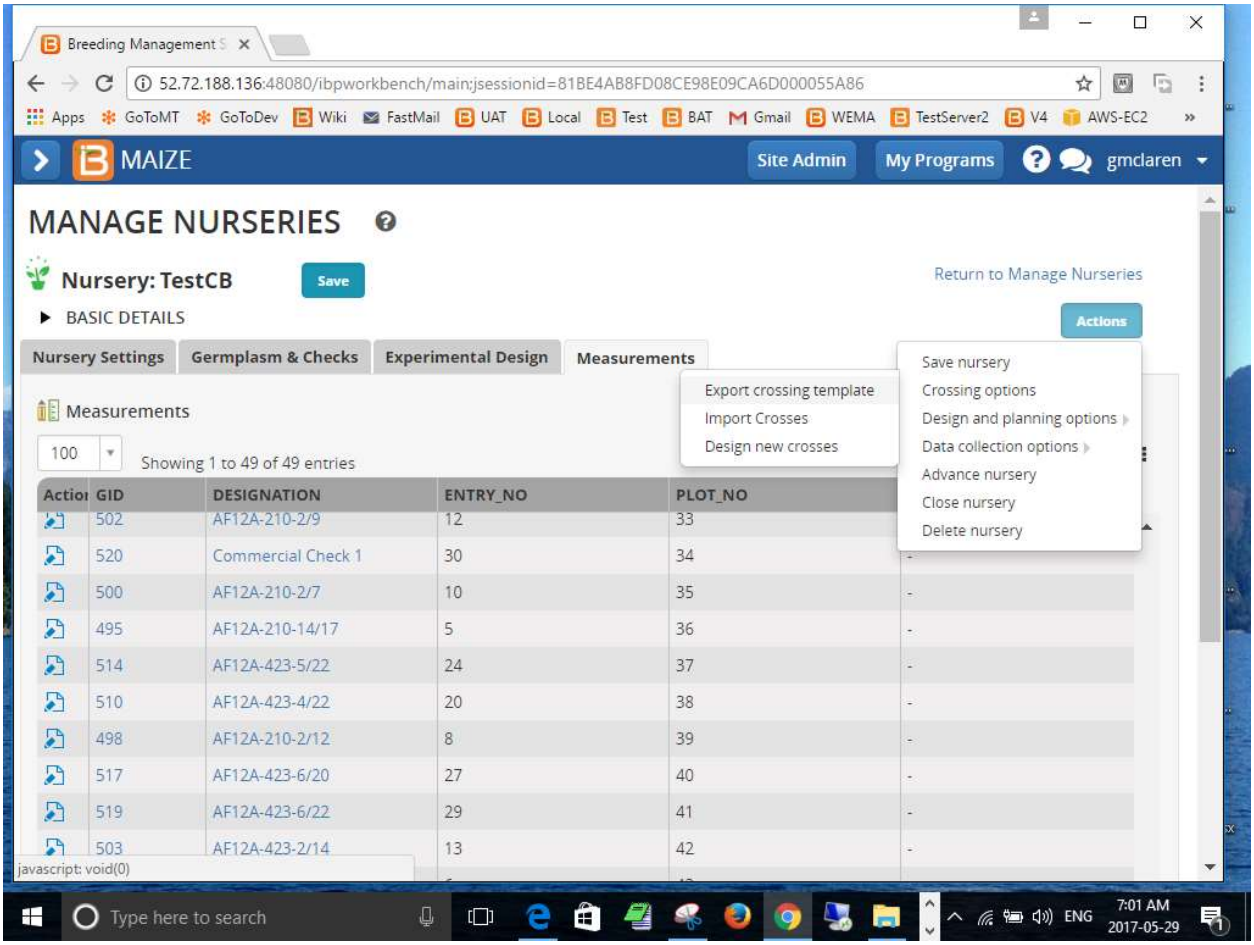
The ENTRY_NO column is just the stack of the rows of entry numbers in the field lay-out.

Next, import this design template into the nursery and save the nursery with the import design option.





Export a crossing template



Complete the crossing template with the crosses that you intend to make as follows:

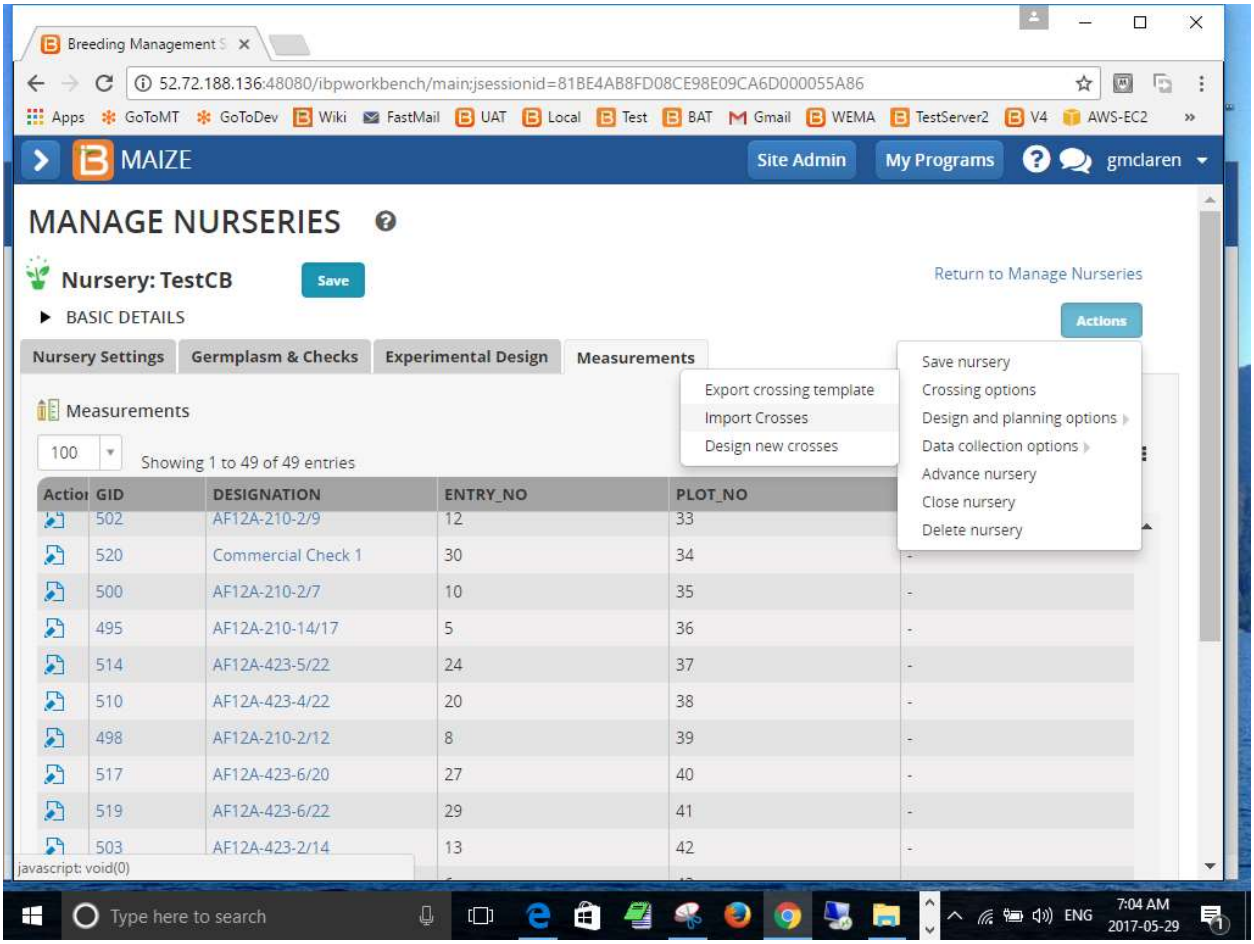
FEMALE PLOT	MALE NURSERY	MALE PLOT	BREEDING METHOD	CROSSING DATE
2		1	C2W	20170529
3		1	C2W	20170529
4		1	C2W	20170529
5		1	C2W	20170529
6		1	C2W	20170529
7		1	C2W	20170529
9		8	C2W	20170529
10		8	C2W	20170529
11		8	C2W	20170529
12		8	C2W	20170529
13		8	C2W	20170529

14	8	C2W	20170529
16	15	C2W	20170529
17	15	C2W	20170529
18	15	C2W	20170529
19	15	C2W	20170529
20	15	C2W	20170529
21	15	C2W	20170529
23	22	C2W	20170529
24	22	C2W	20170529
25	22	C2W	20170529
26	22	C2W	20170529
27	22	C2W	20170529
28	22	C2W	20170529
30	29	C2W	20170529
31	29	C2W	20170529
32	29	C2W	20170529
33	29	C2W	20170529
34	29	C2W	20170529
35	29	C2W	20170529
37	36	C2W	20170529
38	36	C2W	20170529
39	36	C2W	20170529
40	36	C2W	20170529
41	36	C2W	20170529
42	36	C2W	20170529
44	43	C2W	20170529
45	43	C2W	20170529
46	43	C2W	20170529
47	43	C2W	20170529
48	43	C2W	20170529
49	43	C2W	20170529

This is easily done by generating plot numbers 1 to 49 in the FEMALE PLOT column and deleting the cells with the male plots – 1,8,15,22,29,36 and 43. Then repeat the male plots in the MALE PLOT column against the females in each row of the lay-out.

The breeder then only needs to fill in the cross method and the date as the crosses are made.

Finally the crossing template is imported and the crosses created.



Answer the questions about crossing methods and naming conventions and save the list of cropsses.