Crop Pedigree Recording (CPR) Excel Macro: F1 Crosses & F_{n+1} Selection

Excel Macro Add-In to Generate F1 Crosses and F_{n+1} Selection Pedigree Names (version 4.6)

Sometimes breeders may buy and install complicated software to automate simple tedious task like naming F1 crosses using a standardized pedigree recording system starting from parents' names. Others may do similar task manually which might results into typing errors. This is a customized Excel macro developed to automate the task of pedigree recording implemented in a popular Excel spreadsheet environment.

Pedigree Recording System

A standardized pedigree recording system is used for crosses. The female parent is designated by listing it first (starting from the left) followed by the male parent (following on the right). Thus, if A is the female parent and B the male parent, their cross is represented as A/B. Further, if this F1 (A/B) is pollinated with parent C, then the F1 is used as the female and C as the male, resulting cross is designated as A/B//C. Subsequent crosses with parental materials D, E, F and G used sequentially as males are indicated using a number recording the cross order in the following fashion (see columns A & B in Screen Shot 1):

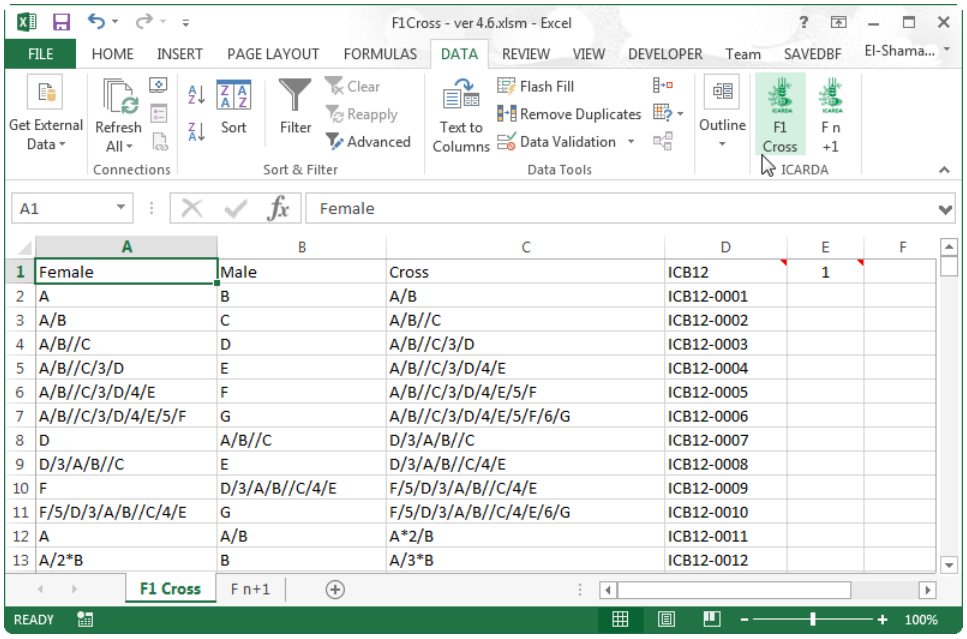
A/B//C/3/D/4/E/5/F/6/G

However, subsequent parents (D, E, F, and G) are crossed alternately as female and then as male, rather than always as a male as in the first example, the cross would be indicated as follows:

F/5/D/3/A/B//C/4/E/6/G

Backcrosses are designated with an asterisk * and a number indicating the dosage of the recurrent parent. The asterisk and the number are placed next to the crossing symbol that refers to the recurrent and donor parents. The following are examples of pedigree formats with backcrosses:

- A is the recurrent parent: A*2/B
- B is the recurrent parent: A/3*B
- A/B is the recurrent parent: A/B*4//C/D
- C/D is the recurrent parent: A/B//5*C/D



	A	B	C	D	E	F
1	Female	Male	Cross	ICB12	1	
2	A	B	A/B	ICB12-0001		
3	A/B	C	A/B//C	ICB12-0002		
4	A/B//C	D	A/B//C/3/D	ICB12-0003		
5	A/B//C/3/D	E	A/B//C/3/D/4/E	ICB12-0004		
6	A/B//C/3/D/4/E	F	A/B//C/3/D/4/E/5/F	ICB12-0005		
7	A/B//C/3/D/4/E/5/F	G	A/B//C/3/D/4/E/5/F/6/G	ICB12-0006		
8	D	A/B//C	D/3/A/B//C	ICB12-0007		
9	D/3/A/B//C	E	D/3/A/B//C/4/E	ICB12-0008		
10	F	D/3/A/B//C/4/E	F/5/D/3/A/B//C/4/E	ICB12-0009		
11	F/5/D/3/A/B//C/4/E	G	F/5/D/3/A/B//C/4/E/6/G	ICB12-0010		
12	A	A/B	A*2/B	ICB12-0011		
13	A/2*B	B	A/3*B	ICB12-0012		

Screen shot 1 (CPR macro)

How does it work?

List your female parents in the first column "A" starting from the cell "A2" (cell "A1" left for column title) without leaving any blank cell, the first blank cell will refer to the end of the list. Associated male parents should list in the next column "B" starting from cell "B2" in the same way.

Once you insert female and male parents' names in required format, go to the "Data" Ribbon, you will find "F1 Cross" button in the new "ICARDA" group at the end of that Ribbon. Click on that button to run the associated VBA macro which will apply the rules of standardized pedigree naming style for crosses record by record, the resulted cross name will be written in the next column (i.e. column "C" in the current active sheet).

The next column (i.e. column "D") will use the prefix you set in the header cell "D1" (which usually refers to the location, crop, and year; for example the prefix "ICB12" refers to ICARDA, Barely crop, and year 2012), this prefix will concatenate to an increment four digits number refers to the cross ID and separated by "-".

In some cases you may need to start entry number for cross ID using a different number rather than 0001 (e.g. sometimes in back cross/top cross cases you may prefer to start from 20001 for example just to differentiate it from the normal crosses), therefore users are able to choose the starting entry number for the very first cross in the "E1" cell.

References: *Van Ginkel, M., R. M. Trethowan, K. Ammar, J. Wang, and M. Lillemo, 2002: Guide to bread wheat breeding at CIMMYT. Wheat Special Report No. 5. (Revised edition Mexixo, D.F.) CIMMYT.*

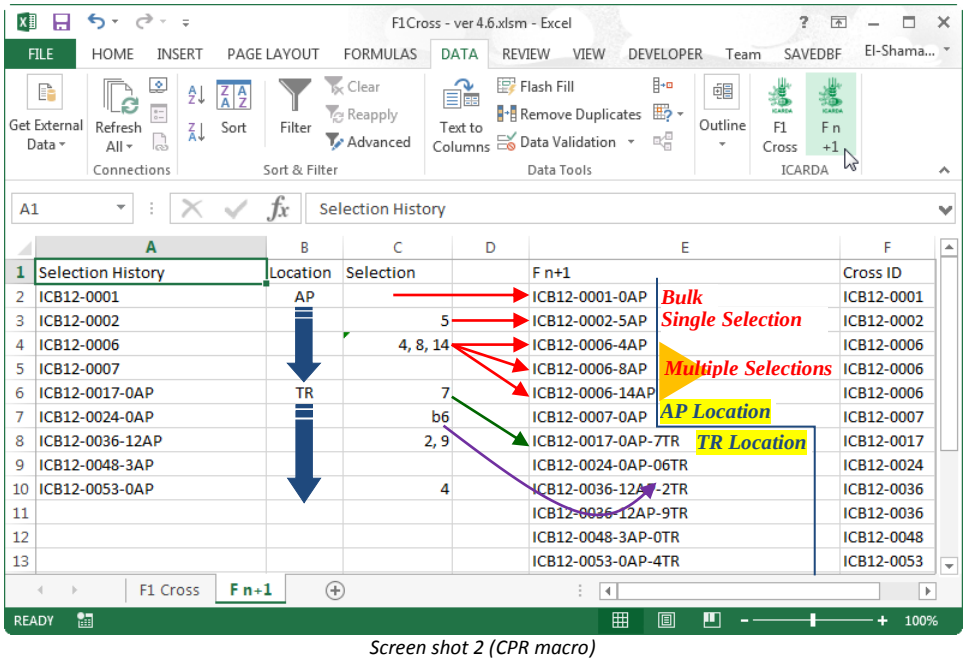
F_{n+1} Segregating from an F_n List

This functionality used to generate F_{n+1} list for segregating populations from F_n list.

You have to list your own data in the "F n+1" sheet where the first column has "Selection History" information which was gathered during the F_n growing season for each segregating population. All the information will automatically be carried forward into the F_{n+1}.

The second column "B" contains the "Location" code which used to identify where and possibly when the selections were made, such as AP12 for Aleppo 2012, for example. The default location code is AP; you have to add the location code only once at the first selection record, the rest of the records will automatically use that location code until you insert a new location code explicitly in any given record, in that case new location code will be used starting from that record on.

The "Selection" information should be listed in the third column "C", this will be used to define selection indicator, if associated selection indicator cell is blank then it refers to bulk selection which will be coded by 0 as selection indicator, else it refers to the selected plant number in the pedigree method (you can list set of numbers using comma as a separator).



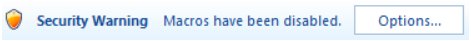
Screen shot 2 (CPR macro)

In the case of selected bulk method, you have to list in the associated selection cell value like "b6" for example which indicates that 6 plants were selected and harvested in bulk, this is important to distinguish it from pedigree method (in that case associated selection cell value can be for example "6" to indicate that plant number 6 was selected and harvested separately).

Once you insert required information, go to the "Data" Ribbon, and click on the "F n+1" button in the "ICARDA" group to run the associated VBA macro which will increase the pedigrees in the F_n list by "-" together with the appropriate selection number and the location code. The resulted F_{n+1} list will be written in the next column (i.e. column "E").

Notice – Security Warning!

You will need Microsoft Excel 2007 or later version to run this macro. This Excel macro enabled workbook file (*.xlsm) contains macros written in Visual Basic for Applications (VBA), so that when you open it you will see a security warning for enabling macros. In the case of this spreadsheet, you must select "Enable Macros" or it will not work at all! If you not even offered this choice, then you must have your security level in Microsoft Excel set at "Medium".



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