1. OPEN EAAP.xls & ENABLE MACROS

If a dialog box (Figure 1) opens automatically with a message about macros, choose to "Enable Macros." In cases when this box does not show up or a warning message (Figure 2) shows up, you should lower the macro security level to "Medium" as shown in Figure 3 in order to use all the functions in EAAP. Close the Excel program and reopen it in order to enable macros capabilities (Figure 1).



Figure 1. A dialog box asking whether to disable or enable macros. When you open the file EAAP.xls, a dialog box will appear asking if you want to enable macros or not. Choose to *Enable Macros*.

Microsoft	Excel
1	Macros in this workbook are disabled because the security level is high, and the macros have not been digitally signed or verified as safe. To run the macros, you can either have them signed or change your security level. Click Help for more information.

Figure 2. A warning message about macro security. Click OK.



Figure 3. Security level change. Select the security level as Medium.

2. EXPERIMENTAL PLAN INPUT

On the "Exp Planning" screen, a user can input experiment information, including the number of available animals, treatments, replications, and animals/pen (Figure 4-a~d). Experimental design choices (Figure 4-e) include CRD (completely randomized design), RCB (randomized complete block design), and conventional method (individually sort by BW and assign treatments as ABCD, DCBA, ABCD, DCBA, ...). The conventional method is, technically, not a randomization.

If gender should be considered in the allotments, a user can check the checkbox (Figure 4-f) in the Gender category. If gender is to be considered as a blocking factor (Figure 4-g), a user can select the number of male blocks

Microsoft Excel - EAAP V 1.0 03-01-2007	_ 0										
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EAAP Experimental Animal Allotment Program											
I. Animal pool											
How many animals are available ? [121](a)											
II. Experimental design											
1. The number of treatments: 4 (b)											
2. The number of replications: 5 (C)											
3. The number of animals/pen: 3 r(d)											
4. Choose one kind of design (based on BW)											
RCB (Randomized Complete Block Design) (e) (If conventional method is selected, CV allowance will be inactivated.)											
III. Gender											
(f) Gender be considered in the allotments	(f)										
(g) © Gender as a blocking factor											
The number of MALE blocks: [3] (i)											
The number of FEMALE blocks: 2 (j)											
(h) Gender balanced pens											
The number of MALEs/pen:											
The number of FEMALEs/pen: 1 (I)											
IV. Coefficient of variation within block based on BW											
(m)											
1. CV (%) allowance of treatment within blocks: (n) 2 (%) (Recommended CV is 1 to 5 %.)											
2. Maximum running frequency for randomization loop until the CV meets the allowance: (0) 30 (Recommended frequency is 30 to 100.)											
V. Are you ready to input animal data ? OK (p)											
K											

Figure 4. Experiment planning sheet.

(Figure 4-i). The number of female blocks (Figure 4-j) is updated automatically. If a user wants to have balanced numbers of males and females in each pen (Figure 4-h), he can select the number of males per pen (Figure 4-k). The number of females per pen (Figure 4-l) is updated automatically.

The CV allowance function (Figure 4-m) randomizes treatment allotment until the CV within each block meets the user-assigned allowance (Figure 4-n). A user also assigns the maximum number of randomization loops (Figure 4-o) to meet the CV allowance.

Clicking the "OK" button (Figure 4-p) or the "Animal Pool" tab will check the correctness of the number input. If any incorrect number input is found, an error message will result (Figure 5). If all the inputs are found to be correct, the "Animal Pool" sheet will be activated (Figure 6).



Figure 5. User input error messages

3. ANIMAL INFORMATION INPUT

In the "Animal Pool" sheet, a user can input the current location (or pen number), identification number, body weight, gender, and ancestry of animals (Figure 6). The identification number and body weight information should be input. Current location (or pen number) of animals is important information when animals are actually relocated to experimental pens. The gender of animals should be input as "M" or "F" if gender is to be considered in the allotment (Figure 4-f). Maternal and paternal ancestry information is relatively optional, but may be needed to check a biased ancestry of a pen. If any previous data exist, a user can click the "Clear Current Data" button to clear and reformat the cells.





A user may type animal information, or copy it from another worksheet and paste it here (Figure 6-a). As animal body weights and genders are input into the light yellow cells, the counts for animals, males, and females in the sky blue color cells will be instantly changed. If a user wants to modify the experimental design, clicking the "Modify Exp Plan" or "Exp Planning" tab will activate the "Exp Planning" sheet.

The "Run Animal Allotment" button will start to run the animal allotment based on the user-assigned experimental design and the animal information. The allotment procedure is performed in the "Allotment" sheet, and the result is displayed and summarized in the "Summary" sheet. If the quantity of one gender is not enough for the experimental plan, an error message will show up and ask a user to change the experimental plan or edit the information of animals available (Figure 7).

EAAP - user input error	×
The number of MALEs (= 77) you input here is LESS than the required number of MALEs (= 96) based on your experimental plan. Please either change you experimental plan or edit the animal information in the current sheet	r

Figure 7. User input error message due to insufficient number of a gender

4. ALLOTMENT RESULT AND SUMMARY

In the "Summary" sheet (Figure 8), an allotment result and a summary table will be displayed. The former shows individual animals in each replication (block) and treatment group; the latter demonstrates mean values of animal weight for each pen, treatment, and replication (block). The CV of treatment values for each block is also shown in blue. If the gender is considered as a blocking factor (Figure 4-g), the gender for each block (replication) is specified on the bottom of the summary table. If the CV values are not low enough (the treatment means within the block are not homogeneous - although "enough" is a rather subjective term), a user may open the "Exp Planning" tab, lower the CV allowance, and run the allotment again.

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3 Animal Allotment Result										Sumn	nary c	of Ani	mal A	llotm	ent		
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6	4504	M	450	Duroc1	14.0	1	A				В	14.05	12.76	11.59	13.54	11.80	12.7
7	4485	M	448	Duroc1	13.6	1	А	14.08		П	С	13.90	12.79	11.54	13.35	11.61	12.6
8	4441	M	444	Duroc2	14.7	1	В			Т	D	14.13	12.79	11.55	13.32	11.48	12.6
9	3876	M	387	Duroc5	14.0	1	в				Mean	14.04	12.77	11.60	13.35	11.67	12.6
10	4488	M	448	Duroc1	13.5	1	в	14.05		П	CV	0.72	0.21	0.66	1.12	1.32	0.40
11	3848	M	384	Duroc4	14.6	1	С				Gender	М	М	М	F	F	
2	4371	M	437	Duroc3	13.7	1	С			П							
13	3883	M	388	Duroc5	13.4	1	С	13.90									
4	4477	M	447	Duroc1	14.5	1	D			Т							
15	4501	M	450	Duroc1	14.5	1	D										
16	4483	M	448	Duroc1	13.5	1	D	14.13	0.72								
17	4465	M	446	Duroc1	13.0	2	А			Т							
18	3874	M	387	Duroc5	12.8	2	А										
19	4300	M	430	Duroc3	12.4	2	A	12.73									
20	3844	M	384	Duroc4	13.3	2	В										
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59	4417	F	441	Duroc3	12.4	5	C			1							
50	3863	F	386	Duroc4	11.5	5	С			1							
51	3864	F	386	Duroc4	11.0	5	С	11.61		T							
52	3850	F	385	Duroc4	12.0	5	D			1							
53	3831	F	383	Duroc4	11.4	5	D										
54	4430	F	443	Duroc2	11.0	5	D	11.48	1.32								
65																	
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Figure 8. An allotment result and a summary table.

If maternal and/or paternal ancestry is provided in the "Animal Pool" sheet (Figure 6), the ancestry information for individual animals will be shown in the allotment result. A user may check if a biased ancestry exists within a pen and switch the animals. When the manual change function is checked (Figure 9-a), animal selection boxes and the "Switch" button are activated. In this example (Figure 9-a), treatment B and D in replication (block) four are relatively biased: two animals in each pen are littermates, and all three animals share a paternal source. Thus, "4414F" and "4433F" are switched (Figure 9-b). If the switch results in unexpected changes of pen means and/or block CV, a user may click the "Switch" button again to undo the change.

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6	4504	M	450	Duroc1	14.0	1	A			B	14	.05	12.76	11.59	13.54	11.8	0 12.7		4	504	M	450	Du	roc1	14.0	1	A				B	14.05	12.76	11.59	13.41	11.80	12.72
7	4485	M	448	Duroc1	13.6	1	A	14.08		C C	13	.90	12.79	11.54	13.35	11.6	1 12.6	- 7	4	485	M	448	Du	roc1	13.6	1	A	14.08			č	13.90	12.79	11.54	13.35	11.61	12.64
8	4441	М	444	Duroc2	14.7	1	в			D	14	.13	12.79	11.55	13.32	11.4	8 12.6	8	4	441	М	444	Du	roc2	14.7	1	в				D	14.13	12.79	11.55	13.45	11.48	12.68
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48	4503	F	450	Duroc1	13.5	4	С											4	3 4	503	F	450	Du	roc1	13.5	4	С										
49	3852	F	385	Duroc4	12.6	4	С	13.35										4	3 3	352	F	385	Du	roc4	12.6	4	С	13.35									
50	4402	F	440	Duroc3	13.9	4	D				_							- 5] 4	402	F	440	Du	roc3	13.9	4	D										
51	4414	F	441	Duroc3	13.3	4	D				_	_					_	- 5	4	433	F	443	Du	roc2	13.7	4	D										
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Figure 9. Manual correction of a biased ancestry of a pen (a, pre-correction; b, post-correction).

5. ACTUAL MOVING SHEET

For the convenience of finding animals to be used for the experiment, all the animals from the "Animal Pool" sheet (Figure 6-b) are listed and sorted by current location (pen number) in the moving sheet (Figure 10). Assigned replication (block) and treatment for each animal are shown, and the animals that are not used for the experiment are labeled as "Ex." If a user finds an unnecessary column, the column can be hidden (Figure 11).

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13		2	4411	F	441	Duroc3	15.68	Ex	Еx		
14		2	4412	F	441	Duroc3	15.55	Ex	Ex		
115		15	3880	F	388	Duroc5	9.1	Ex	Ex		
116		15	3881	F	388	Duroc5	8.13	Ex	Еx		
117		15	3882	F	388	Duroc5	8.79	Ex	Ex		
118		15	3883	F	388	Duroc5	11.38	5	A		
119		15	3884	F	388	Duroc5	8.36	Ex	Ex		
120		15	3885	F	388	Duroc5	13.92	4	С		
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Figure 10. A moving sheet sorted by current pen number (location).

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Figure 11. Hiding unnecessary columns.