PRODUCTION SCHEDULING

INTRODUCTION

1. **Production Schedule for Facilities**

   A. Primary purpose is to even out the production!
   B. By estimating the No. of sows/group, No. of boars and others for each farrowing group:

      1) Can maximize the utilization of facilities.
      2) Can prevents the production from "piling up" in a particular facility.

2. **Advantages of Scheduling**

   A. Can determine when to clean/disinfect various units for each group of sows/pigs. (Especially useful in the "all-in, all-out" system!)
   B. Can develop routine herd health programs.
   C. Can determine period(s) of high-labor requirements.
   D. Can select or purchase replacement gilts/boars at a proper time.
   E. Can manage boars properly (before, during and after breeding).
   F. Can manage sows/gilts properly (before & during breeding, and during gestation).
   G. Can develop marketing strategies and determine cash flow.
   H. Can help evaluating expansion opportunities and(or) facility requirements.
   I. May provide better cares for sows and pigs during farrowing and lactation phase.

3. **Disadvantages**

   A. No flexibility - have to follow the schedule, period! (Disadvantage?)
   B. Handling of sows not fitting the schedule - Probably the major disadvantage or problem!

      1) Not cycling at a proper time or recycling after breeding.
      2) May have to keep ♀ a long time before fitting into the schedule, and it can be very costly! (Question - "Worth keeping those sows?")

   C. To replace sows:

      1) A replacement gilts pool is required.
      2) Gilts have to be managed properly to fit into the schedule.

4. **Terminology**

   A. Farrowing interval:

      1) The sow's biological cycle, i.e., days between two successive farrowings.
      2) The interval (**I**) includes breeding, gestation and farrowing periods:

         a) Breeding and farrowing times are somewhat flexible.
         b) Gestation is generally fixed (± 1-2 d).

   B. Breeding period:

1) Depends on which cycle to service & how long - Desirable to breed during the first cycle after weaning.
2) The return to "first estrus," normally begins about 3 d after weaning (3-7 d).

C. Weaning age:

   1) One variable that the producer can control within a practical limit.
   2) Directly affects the rest of the schedule.

DETERMINATION OF INTERVAL BETWEEN SOW GROUPS

1. **Equation**

   I = G + RE + WA/NSG

   where I = Interval between sow groups (day), G = Gestation length (day), RE = Minimum No. of days needed for the sow to return to estrus after weaning, WA = Weaning age (day), and NSG = No. of sow groups.

   A. G (114 days) and RE ($\approx$ 4 days) are considered constant.
   B. Others can be changed or manipulated.

   ☞ May be more practical to have "intervals" that are divisible by 7 (or week), but obviously it all depends on other factors!

2. **Example** - I = unknown, G = 114 days, RE = 4 days, WA = 35 days, and NSG = 3 groups.

   A. I = 114 + 4 + 35/3 = 51 days interval

   B. What happens to "I" if the producer wants to use 5 Gp of sows instead of 3 Gp?

      1) Change the NSG: I = 114 + 4 + 35/5 = 30.6 days

      2) To get a whole number for I, adjust WA (weaning age)! Want 30-day interval, thus:

         114 + 4 + (x)/5 = 30 days interval
         118 + (x) = (30)(5)
         x = (30)(5) - 118
         x = 32 (weaning age)

3. **"I" and Weaning Age**

   A. "I" has a significant impact on weaning age!

   B. e.g., Intervals of 27 and 28 days.

      114 + 4 + (x)/5 = 27 days   x = 17 days (WA)
      114 + 4 + (x)/5 = 28 days   x = 22 days (WA)

   C. Thus, when weaning pigs at a very young age, the addition of one day to the interval may be very important!

FACILITY SCHEDULE FOR A "NEW OPERATION"

☞ Assumptions for the example: 51-day interval, 3 groups of sows, 10-day breeding period, and sows into the farrowing unit 6 days before expected date.

1. **Sow groups**

   - Should be listed in the group column (Gp) - A1, B1, C1, A2, etc.

Gp	BREEDING				GESTATION		FARROWING			
	In	1st Sow	Last Sow	Out	In	Out	In	1st Sow	Last Sow	Out
A1	(1st cycle for Group A)									
B1										
C1										
A2	(2nd cycle for Group A)									

2. **Breeding Facility Schedule**

   A. Arbitrarily select **day 1** - The day to start breeding Group A1!
   B. Then:

Gp	BREEDING				GESTATION		FARROWING			
	In	1st Sow	Last Sow	Out	In	Out	In	1st Sow	Last Sow	Out
A1	1	1	11	47						
B1	48	52	62	98						
C1	99	103	113	149						
A2	150	154	164	200						

   1) Group B1 should begin breeding on **day 52** (1 + 51).
   2) Group C1 on **day 103** (52 + 51) . . . , etc.

   C. If the breeding period is **10 days**:

   1) The last sow should be serviced by **day 11** (1 + 10).
   2) Group B1 on **day 62** (11 + 51 or 52 + 10).
   3) Group C1 on **day 113** (62 + 51) . . . , etc.

   D. Moving sows into the breeding unit:

   1) Many sows are coming into estrus about **4 days** after weaning. (Majority of sows - 3 to 7 days after weaning! Hopefully!)
   2) "In" column for the breeding unit should be **4 days less** than the "1st sow" column!

      a) For Group A1, assume moving sows & breeding the "1st sow" on the same day.
      b) Group B1 must be moved into the unit by day **48** (52 - 4).
      c) Group C1 by day **99** (48 + 51 or 103 - 4) . . . , etc.

   E. Moving sows out of the breeding unit:

   1) Group B1 must come into the breeding unit by day 48, ∴ have to move Group A1 before that day!
   2) In this example, move Group A1 sows on day **47**. [But, better to empty the unit (other units too) ≥ a week before the next group so that it can be cleaned & disinfected though!]
   3) Group B1 on day **98** (47 + 51).
   4) Group C1 on day **149** (98 + 51) . . . , etc.

3. **Gestation Facility Schedule**

   A. For Group A1, "Out" date for the breeding unit becomes "**In**" date for the gestation unit, i.e., **day 47**.

      ◦ Similarly, enter dates for other groups!

Gp	BREEDING				GESTATION		FARROWING			
	In	1st Sow	Last Sow	Out	In	Out	In	1st Sow	Last Sow	Out
A1	1	1	11	47	47	109				
B1	48	52	62	98	98	160				
C1	99	103	113	149	149	211				
A2	150	154	164	200	200	262				

   B. When to move out? Depends on the timing of moving sows into the farrowing unit!

4. **Farrowing Facility Schedule**

   A. Moving sows into the farrowing unit:

Gp	BREEDING				GESTATION		FARROWING			
	In	1st Sow	Last Sow	Out	In	Out	In	1st Sow	Last Sow	Out
A1	1	1	11	47	47	109	109	115	125	150
B1	48	52	62	98	98	160	160	166	176	201
C1	99	103	113	149	149	211	211	217	227	252
A2	150	154	164	200	200	262	262	268	278	303

      1) Should be 4 to 6 days before day 114 of gestation or expected date. (Use 6 days in this example: 115 - 6 = **day 109** for Group A1!)
      2) The date for moving out (gestation unit) = moving in (farrowing unit).

   B. Moving sows out of the farrowing unit:

      1) Group A2 (2nd time for Group A) - Start breeding on **day 154**, and it takes ≈ **4 days** for sows to return to estrus after weaning! Thus, have to wean Group A1 on or by **day 150**!
      2) For other groups, just add 51 days - e.g., 150 + 51 = 201 for Group B1.

   ☞ Intended to wean pigs at 35 days of age, but actually end up with **25** (150 - 125 = 25) to **35** (150 - 115 = 35) days! Thus, again, important to consider weaning age when working on the schedule!

5. **Nursery & Growing/Finishing Facilities**

      ◦ Nurseries are generally designed to hold pigs until 40 to 50 lb.
      ◦ A common practice to keep pigs in the nursery for 4 to 5 weeks.

Gp	NURSERY		GROWING		FINISHING	
	In	Out	In	Out	In	Out
A1-p	150	178	178	?	?	?
B1-p	201	228	228	?	?	?
C1-p	252	280	280	?	?	?
A2-p	303	331	331	?	?	?

(Gp-p = pigs from respective sow groups.)

   •. In this e.g., pigs in the nursery for 4 wk:

      1) Pigs from Group A1 remain in the unit from weaning (day 150) until day 178 (150 + 28).
      2) Pigs from Group B1 (to be moved in on day 201) are not forcing "Group A1-pigs" out, thus, can keep pigs in the nursery longer! (Some pigs are 63 days old, but some are only 53 days old!)
      3) For other groups, just add 51 days.
      4) "Out" (nursery) = "In" (grower-finisher unit).

6. **After Completing a "Basic" Schedule:**

   A. May want to incorporate other aspects of swine production in the schedule to make it
      more complete - e.g., selection/stimulation of gilts, cleaning & disinfection of units, etc.
   B. Then, convert the "Julian dates" to "calendar dates" using a conversion sheet!

JULIAN CALENDAR

Day of Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day of Month
1	1	32	60	91	121	152	182	213	244	274	305	335	**1**
2	2	33	61	92	122	153	183	214	245	275	306	336	**2**
3	3	34	62	93	123	154	184	215	246	276	307	337	**3**
4	4	35	63	94	124	155	185	216	247	277	308	338	**4**
5	5	36	64	95	125	156	186	217	248	278	309	339	**5**
6	6	37	65	96	126	157	187	218	249	279	310	340	**6**
7	7	38	66	97	127	158	188	219	250	280	311	341	**7**
8	8	39	67	98	128	159	189	220	251	281	312	342	**8**
9	9	40	68	99	129	160	190	221	252	282	313	343	**9**
10	10	41	69	100	130	161	191	222	253	283	314	344	**10**
11	11	42	70	101	131	162	192	223	254	284	315	345	**11**
12	12	43	71	102	132	163	193	224	255	285	316	346	**12**
13	13	44	72	103	133	164	194	225	256	286	317	347	**13**
14	14	45	73	104	134	165	195	226	257	287	318	348	**14**
15	15	46	74	105	135	166	196	227	258	288	319	349	**15**
16	16	47	75	106	136	167	197	228	259	289	320	350	**16**
17	17	48	76	107	137	168	198	229	260	290	321	351	**17**
18	18	49	77	108	138	169	199	230	261	291	322	352	**18**
19	19	50	78	109	139	170	200	231	262	292	323	353	**19**
20	20	51	79	110	140	171	201	232	263	293	324	354	**20**
21	21	52	80	111	141	172	202	233	264	294	325	355	**21**
22	22	53	81	112	142	173	203	234	265	295	326	356	**22**
23	23	54	82	113	143	174	204	235	266	296	327	357	**23**
24	24	55	83	114	144	175	205	236	267	297	328	358	**24**
25	25	56	84	115	145	176	206	237	268	298	329	359	**25**
26	26	57	85	116	146	177	207	238	269	299	330	360	**26**
27	27	58	86	117	147	178	208	239	270	300	331	361	**27**
28	28	59	87	118	148	179	209	240	271	301	332	362	**28**
29	29	★	88	119	149	180	210	241	272	302	333	363	**29**
30	30		89	120	150	181	211	242	273	303	334	364	**30**
31	31		90		151		212	243		304		365	**31**

★ In leap years, after February 28, add "1" to the tabulated number. As the figures go into the second year, they can be kept within the limits of the table by subtracting 365 or 366 (leap year): e.g., 395 is January 30 → 395 - 365 = 30, ∴ January 30; leap year prior: 396 is January 30 → 396 - 366 = 30, ∴ January 30. Leap year - Subtract "1" from the tabulated number when going from the Julian to calendar date.

FACILITY SCHEDULE FOR THE EXISTING HERD

1. **Expected Farrowing Dates** - See a box.

2. **Step 1**

   A. Look at available breeding or expected farrowing dates of the herd.
   B. Because the weaning date is the "Master Control Switch," it is better to use the farrowing dates.

3. **Step 2**

   A. Locate a group of sows that are close together, and assign group number (e.g., A1).
   B. All sows in the group have to be weaned on the same day, thus may have to wean some sows very early and others very late!
   C. Group other sows in the herd by expected farrowing dates, letting sows cycle 1 x or 2 x, adding a new group of gilts, etc.

4. **Example**

   ○ The producer wants: 3 groups of sows, 10 sows per group, wean pigs at 35 days of age, and interval of 51 days.

   A. Organization of farrowing dates - See a box.
   B. Step-by-step:

   1) Farrowing unit - for the A1 group, use the date for Sow # 9 (≈ middle):

      a) Weaning at day 35 of lactation → 97 + 35 = **132** ☞ weaning date.
      b) Wean all sows at day 132 (weaning age, 28 to 41 days).

   2) Breeding unit:

      a) For Group A1 - "In" on day 132 & "1st sow" on **day 136** (132 + 4).
      b) For Group B1 - "In" on **day 183** (132 + 51) & "1st sow" on **day 187** (136 + 51).

Sow No.	Due	Sow No.	Due	Sow No.	Due
1	104	11	180	21	161
2	91	12	174	22	159
3	100	13	168	23	177
4	95	14	162	24	169
5	94	15	179	25	170
6	102	16	160	26	175
7	98	17	182	27	178
8	99	18	176	28	163
9	97	19	164	29	166
10	96	20	165	30	167

Gp.	Sow No.	Farrowing unit Date due	Date weaned	Pig age	Breeding unit In	1st sow
	2	91		41		
	5	94		38		
	4	95		37		
	10	96		36		
A1	*9*	*97*	132	35	132	136
	7	98		34		
	8	99		33		
	3	100		32		
	6	102		30		
	1	104		28		
	22	159		24		
	16	160		23		
	21	161		22		
	14	162		21		
B1	28	163	183	20	183	187
	19	164		19		
	20	165		18		
	29	166		17		
	30	167		16		
	13	168		15		
	24	168		45		
	25	170		43		
	12	174		39		
	26	175		38		
C1	18	176	213	37	213	238
	23	177		36		
	27	178		35		
	15	179		34		
	11	180		33		
	17	182		31		

☞ Weaning age is **15 to 24** days, ∴ have to provide a good environment (nursery, diets, etc.) for pigs!

c) For Group C1 - The 1st sow will to be bred on **day 238** (187 + 51):

(1) If wean sows on **day 234**, weaning age would be **52 to 66** days!
(2) Instead, wean sows on **day 213** (weaning age, 31 to 45 days), and let sows cycle once (238 - 4 - 21 = day 213 ✍ weaning date).

C. Summary:

Gp	In	Farrowing unit 1st sow	Last sow	Out	In	Breeding unit 1st sow	Last sow	1st due
A1		91	104	132	132	136	146	250
B1		159	*168*	183	183	187	197	301
C1		*168*	182	213	213	238	248	352
A2	244	250	260	285	285	289	299	38
B2	295	301	311	336	336	340	350	89
C2	346	352	362	387	387	26	36	140
A3	32	38						
B3	83	89						
C3	134	140						

☞ May experience considerable difficulties in the farrowing unit and nursery in the beginning!