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THE APPLICATION OF SOME PARTIAL RECORDING SYSTEMS IN EGG PRODUCTION

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SUMMARY

The experiment was carried out during the laying seasons 1959 and 1960 at the Poultry Experimental farm, Department of Animal Breeding, Faculty of Agriculture, Cairo University. It included as a final number about 200 layers of Fayoumi, Baladi and Rhode Island Red that reached maturity at either summer or autumn months. The main purpose of study was to compare some part time methods of egg recording in order to evaluate their accuracy for predicting the total laying ability of the bird. The periods used in this respect were :

(1) One — Week per month. (2) Two days per week.
(3) The first 90 days. (4) March and April.
(5) The last 60 days. (6) The duration of the first 10 eggs.

The main results obtained could be summarized in the following:-

1.—The best method of partial recording was that of the 2 days per week. Its correlation with the full annual record was as high as 0.86 on the average. About 70% of the birds differed by less than 10 eggs from actual record when applying this method. Moreover, higher relationships were obtained for egg weight.

2.—Second was that method involving one week per month. The predictability of this method showed somwhat similar accuracy with the two indigenous breeds of Fayoumi and Baladi, possibly because of similar response to surroundings.

3.—The first 90 days method was of moderate expression compared with the former methods. The fact that sexual maturity takes place within the worst seasons of the year (summer and autumn) may be responsible for such result. It may be suggested that this method of tentative selection ought to be followed under our conditions with further partial recording of suitable length for more concrete selection.

4.—The other methods of partial recording showed about the same moderate accuracy. Figures obtained with the method of average weight of first 10 eggs deserve special attention. It could be more useful in predicting prospective egg weight especially when the average age and body weight at sexual maturity could be of more homegenity than observed nowadays. In fact, it may be considered, from the point of view of the average farmer, the best easy and quick method for egg weight prediction.

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INTRODUCTION

Egg records are the basis of constructive breeding for increasing egg production. The first year production record had so far been considered as the best reliable estimate for the productive potentiality of the bird, since it represents an intity based on the biological grounds for the full time production. From the stand point of practical management this method involves certain difficulties. Apart from the time and labour consumed in carrying out the trapnesting for all the stock during the pullet year, the task of subsequent record keeping and analysis asks for additional expenses and duties. Hence a solution involving modification of the expression of the first year record has always been sought by both poultry breeder and farm manager.

Several attempts were tried in this direction; partial recording methods were introduced in different trials with the aim of cutting down the expenses and work involved in the full year recording, without losing much reliability and validity for the egg record.

PREVIOUS WORK

A large number of workers have tried to cut down the recording period up to the first three or four months of production, on the assumption that the heavy layers could prove themselves easily up to this age, and accordingly could be saved for later production, while the poorer ones are culled in the shortest period of time, (Thompson (1933), Bronkhorst (1935), Veit (1942), Veiza and Raimo (1942), Hays (1946), Skaller (1954), Ghany (1955) and Onishi and Kato (1960).

Other methods of partial recording were based on spring production or late production, on the grounds that these phases represent the genetic status of intensity, or persistency, or birds having high potential egg laying capacity. Veiga and Raimo (1942), Thompson (1933) and Hays (1946).

Recently, workers have followed some other methods for partial recording which cover numerous segments of the laying, i.e. one week every month, or two days every week, Voitellier (1930), Duddly (1931), Obsent (1939), Schnetzler (1941), Hays (1946), Godfrey (1948) and Ghany (1955).

Material and Methods : -

The experiment was conducted at the poultry research center, Animal Breeding Department, Faculty of Agriculture Cairo University. Data were collected from 68 Fayoumi, 75 Baladi and 52 Rhode Island Red birds that completed their first laying year. The daily records were individually obtained for the whole pullet year (365 days after sexual maturity). Several partial systems were tested against the full year records for egg number and egg weight.

These short intervals included the following methods :

(1) One-week every month through-out the laying year.

(2) Two-days every week through-out the laying year.

(3) The first 90 days of laying.

(4) The last 60 days of production.

(5) March and April production.

(6) The duration of the first 10 eggs, i.e. the number of days required for the hen to produce her first 10 eggs.

TABLE 1.

Correlation Coefficients between Annual Egg Number and Number of Eggs Obtained in the Different Systems of Partial Recording for Fayoumi, Bladi and Rhode Island Red.

Breed	Methods of partial recording					
	First week Month	First 2 days Week	First 90 days	Last 60 days	March & April	First 10 eggs duration
Fayoumi	+0.7762 (**)	+0.8678 (**)	+0.3478 (**)	+0.5318 (**)	+0.5122 (**)	—0.2022 (**)
Baladi	+0.7986 (**)	+0.8759 (**)	+0.5601 (**)	+0.3127 (**)	+0.3779 (**)	—0.4268 (**)
R.I.R.	+0.8056 (**)	+0.9342 (**)	+0.4201 (**)	+0.3042 (**)	+0.4819 (**)	—0.2333 (**)

(**) Significant at 1% level.
(*) Significant at 5% level.
which was, also of negative value.

Results and Discussion

(1) *Egg. Number* :

As could be seen from Table 1 the correlation coefficients between annual egg number and any of the partial recording methods were highly significant. However the magnitude of such relation was different in the various methods. The second method of recording (2 days per week) gave the highest correlation with total egg number (over 0.86) followed by the first method, one week per month (0.77 - 0.80). The other methods, the first 90 days, the last 60 days, March and April and the duration of the first 10 eggs showed moderate correlation values. The lowest relation in this respect was that obtained with the duration of the first 10 eggs.

These results are in full agreement with results obtained in this connection, especially those reported by Voitellier (1930), Duddly (1931), Thompson (1933), Olsen (1939), Schnetzler (1941-1946), Veiga and Raimo (1942), Hays (1946), Nordskog (1947), Godfrey, (1948) Ghany (1955) and Meat (1956).

Differences in magnitude of correlations obtained in the various methods used may be explained by the variability in production throughout the laying year. The best methods of partial recording were those collected within the different months and more accurately within the different weeks of production. Such methods represented to a great extent the true picture of egg laying through the whole length of the year. The other methods failed to show similar relationships as they were only limited to one phase of production with no regard to same other phases.

It is interesting to note that the number of days of trapping may be more or less the same in two cases, but the distribution through out the year may differ, causing the

difference in efficient prediction. For example the one week/month system only involved recording for 84 days, yet it gave better representation, and thus better estimation to the annual egg number than the continuous period of the first 90 days. So it is emphasized once more that egg production is greatly variable through the laying season and the more we scatter the days for sample recording the more we better gain predictability.

Results given in Table 2 illustrate the expected estimations of records in the various partial methods. The differences between the actual and expected records (calculated by the regression equations) were obtained for each pullet and percentage distributions of deviations were calculated as indicated. It is seen from Table 2 and that the second method of partial recording (2 days a week) showed the least difference (10 eggs or less) in nearly 70% of the birds and most of the other 30% of birds were within 20 eggs difference.

One week per month method was the second best. However the application of such a method more accurately predicted the Fayoumi and Baladi than the Rhode Island Red. This may be due to the similarity in egg laying rhythms in the indigenous breeds compared with Rhode Island Red. Variability in this connection leads to less accuracy in partial estimation. This was previously illustrated in the work of Hays (1946).

The other methods applied were of about the same deviations. Their distribution showed more precisely that they are less efficient in expectation than neither one of the previous two methods. In fact only about one third of the birds were of less than 10 eggs deviations. It is agreed that the time factor in recording is shorter for either of the last three methods conducted, yet the comparative effeciency is less when compared with the first two systems.

As it is the validity of the partial record that counts in such estimation, the last four methods may be considered comparatively of moderate certainly.

(2) *Egg Weight.*

As was the case with egg number, the best methods of partial recording fro egg weight were those including 2 days per week and one week per month (Tables 3, 4). The 2 days system however, showed less deviations from the actual yearly egg weight than the weekly system, especially in Fayoumi and Baladi (over 80% of birds were within ± 1.0 gram difference). This means that this is the best way of recording, followed by the one week per month system.

The third method in accuracy was that of March and April average egg weight, which showed higher association with the average annual egg weight than the rest of the partial methods compared. This confirms the previous findings that Spring egg weight determines to a great extent the average annual egg weight.

The average weight of the first 10 eggs method, though showed highly significant correlation, yet differences were generaly larger than whenMarch andApril method was used. However, its relative value was of about the same as the first 90 days method, especially in the two indigenous breeds. This may be a cause for temptation for some managers to anticipate the subsequent ability of the birds by weighing only their first 10 eggs, especially when realizing that more labour and equipment used in weighing eggs, and that egg weight is less variable through the laying season than egg number.

Practical Application

It seems to be agreed that the full year recording is the most reliable method although it is most expensive and labour consuming. The partial recording systems are time and labour saving but have variable efficiencies in selection and breeding schemes. It is of importance to know how reliable these partial records are as estimates for production over the whole year.

In Egypt, egg recording is not followed except in the governmental poultry farms. However records are not kept on all the poultry stocks raised at such farms because of the previously discussed reasons. If partial recording is sought as a solution for such problems, the methods suggested could not be blindly copied from abroad.

The best suitable method that seems to fit in our circumstances for predicting egg yield is that of 2 days/week. The second best is the one week per month method. Both systems showed higher relationships with acutal egg record than any of the other partial systems.

At the convenience of managers, recording may be done on the whole flock through the selected periods or the flock may be devided into 3 or 4 groups for simultanious recording per week or per month. Apart from sering the major task of recording, those two methods, especially the 2 days one, could reveal the nature of production throughout the whole year with remarkable accuracy. The advantage of such knowledge when applying the partial recording is of major importance in our case, as there is a great need to distinguish the more resistant birds to weather obstacles. The birds that could withstand hot summer and show the least autumn passing will be of great help in breeding for better production.

The validity of 2 days/week and one week/month systems was more marked in predicting egg weight. Being less variable, egg weight seems to be more applicable to partial recording than egg number. This fact may be of great use in practical field, as we can limit the recording systems involved to the shortest possible time, thus saving considerable labor.

The application of the first 10 eggs method may not be the best rule for the early maturing birds, as they will definately in a week position compared with the late matured pullets, which have relatively heavier eggs at start of laying. This may require some method for correcting for age of sexual maturity. Without such a correction high producers may be penalized due to smaller egg weights at sexual maturity.

TABLE 2.

Actual and Expected Number of Eggs in the Different Methods of Partial Recording for Fayoumi, Baladi and Rhode Island Red.

Breed & Methods	Average actual pr. eggs	Regression equation	Average estimated prod.	% of birds deviating from actual record 0—10	11—20	21—30	30
F. (134.8)							
First week/month ...	31.88	36.93 + 3.068585 =	133.6	56	32	9	3
1st 2 days/week	43.22	21.12 + 2.6292 =	137.4	66	28	6	0
First 90 days	32.43	111.05 + 0.7307 =	134.5	24	34	22	20
Last 60 days	13.65	115.81 + 1.3876 =	134.6	35	32	18	15
March & April	32.74	69.5 + 1.9981 =	134.9	42	24	19	15
First 10 eggs dur. ...	36.84	141.01 + (—0.1698=)	134.8	27	32	22	19
B (127.1)							
First week/month ...	29.2	37.7 + 3.061 =	127.4	48	37	12	3
1st 2 days/week ...	40.6	22.2 + 2.5839 =	126.9	69	24	7	0
1st 90 days	26.7	104.6 + 0.8413 =	127.0	49	22	17	12
Last 60 days	18.1	114.4 + 0.7002 =	127.1	31	29	27	13
March & April	33.6	81.1 + 1.3686 =	127.1	36	32	17	15
First 10 eggs dur. ...	49.6	138.3 + (—0.2249 =)	126.9	39	31	12	18
R.I.R. (135.8)							
First week/month ...	33.3	36.3 + 2.9867 =	135.7	39	38	19	4
1st 2 days week	43.4	23.1 + 2.5959 =	135.8	73	25	2	0
First 90 days	36.7	106.7 + 0.7939 =	135.7	35	17	21	27
Last 60 days	12.5	123.2 + 1.011 =	135.8	33	21	19	22
March & April	34.3	76.3 + 1.7326 =	135.4	35	27	11	27
First 10 eggs dur. ...	34.1	144.7 + (—0.2623 =)	135.0	35	13	25	20

TABLE 3.

Correlation Coefficient between Actual Annual Egg Weight and Average Egg Weight in the Different Methods of Partial Recording for Fayoumi, Baladi and Rhode Island Red.

Breed	Methods of partial recording					
	First week month	First 2 days week	First 90 Days	Last 60 Days	March and April	First 10 eggs
Fayoumi	+0.8933(*)	+0.8634(*)	+0.4742(*)	+0.5992(*)	+0.7402(*)	+0.5132(*)
Baladi	+0.8557(*)	+0.8947(*)	+0.3480(*)	+0.5363(*)	+0.7710(*)	+0.3369(*)
R.I.R.	+0.9498(*)	+0.9345(*)	+0.6787(*)	+0.2035(*)	+0.6993(*)	+0.4737(*)

(*) Significant 1% level.

TABLE 4.

Actual and Expected Egg Weight in the Different Methods of Partial Recording for Fayoumi, Baladi and Rhode Island Red.

Breed & Methods	Average actual weight (grs)	Regression equation	Average estimated weight (grs)	% of birds deviating from actual record 0-1.0	1.1-2.0	2.1-3.0	3.0
F. (41.4)							
First week/month ...	41.1	3.5 + 0.9224 =	41.3	71	22	4	3
1st 2 days/week	41.4	0.6 + 0.9843 =	41.2	84	6	4	6
First 90 days	39.3	33.1 + 0.2102 =	41.4	37	34	20	9
Last 60 days	41.0	19.5 + 0.5333 =	41.2	37	35	18	10
March & April	42.0	12.1 + 0.6982 =	41.5	61	26	4	9
First 10 eggs.	38.1	33.1 + 0.2186 =	41.5	39	31	24	6
B. (41.6)							
First week/month ...	41.2	5.9 + 0.8557 =	41.4	68	25	4	3
1st 2 days/week	41.7	5.9 + 0.8572 =	41.7	81	15	1	3
First 90 days	38.2	35.5 + 0.1593 =	41.6	31	32	29	8
Last 60 days	40.7	23.4 + 0.4467 =	41.7	39	36	15	10
March & April	42.5	16.2 + 0.6111 =	42.2	60	28	9	3
First 10 eggs.	37.1	35.7 + 0.1592 =	41.6	35	27	28	10
R.I.R. (54.7)							
First week/month ...	54.4	(—0.2)+ 1.0088 =	54.9	81	13	4	2
1st 2 days/week	54.9	(—0.5)+ 1.0057 =	55.3	67	25	6	2
First 90 days	55.9	26.7 + 0.5009 =	54.8	27	37	15	21
Last 60 days	49.7	47.5 ± 0.1438 =	54.5	27	15	21	37
March & April	55.0	27.6 ± 0.5015 =	55.1	44	25	16	15
First 10 eggs.	54.5	39.3 ± 0.3001 =	54.7	33	33	13	21

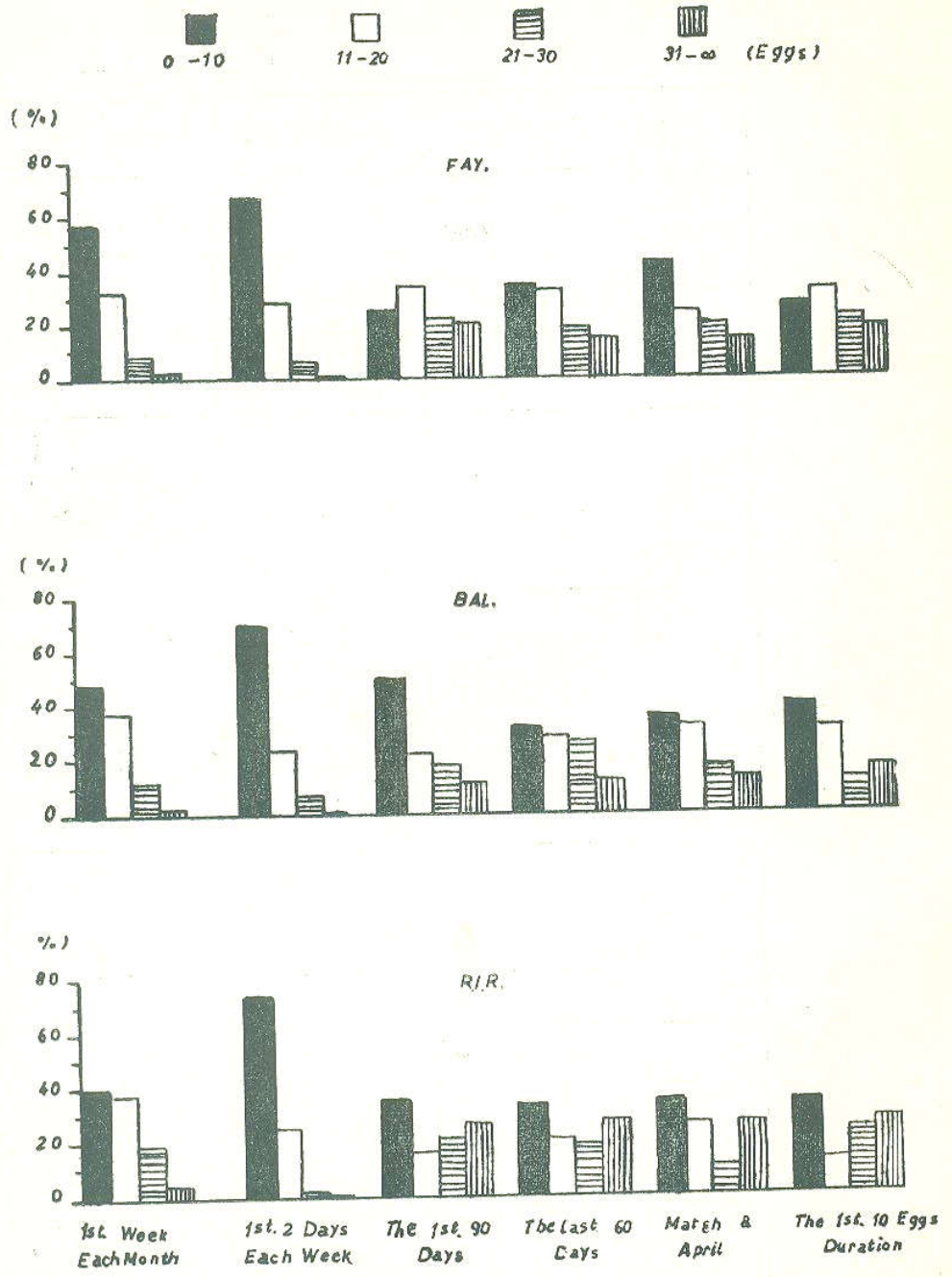

FIGURE 1.—Percentage of Birds Deviating from the Actual Egg Records in the Different Mentioned Methods of Partial Recording (for egg number).

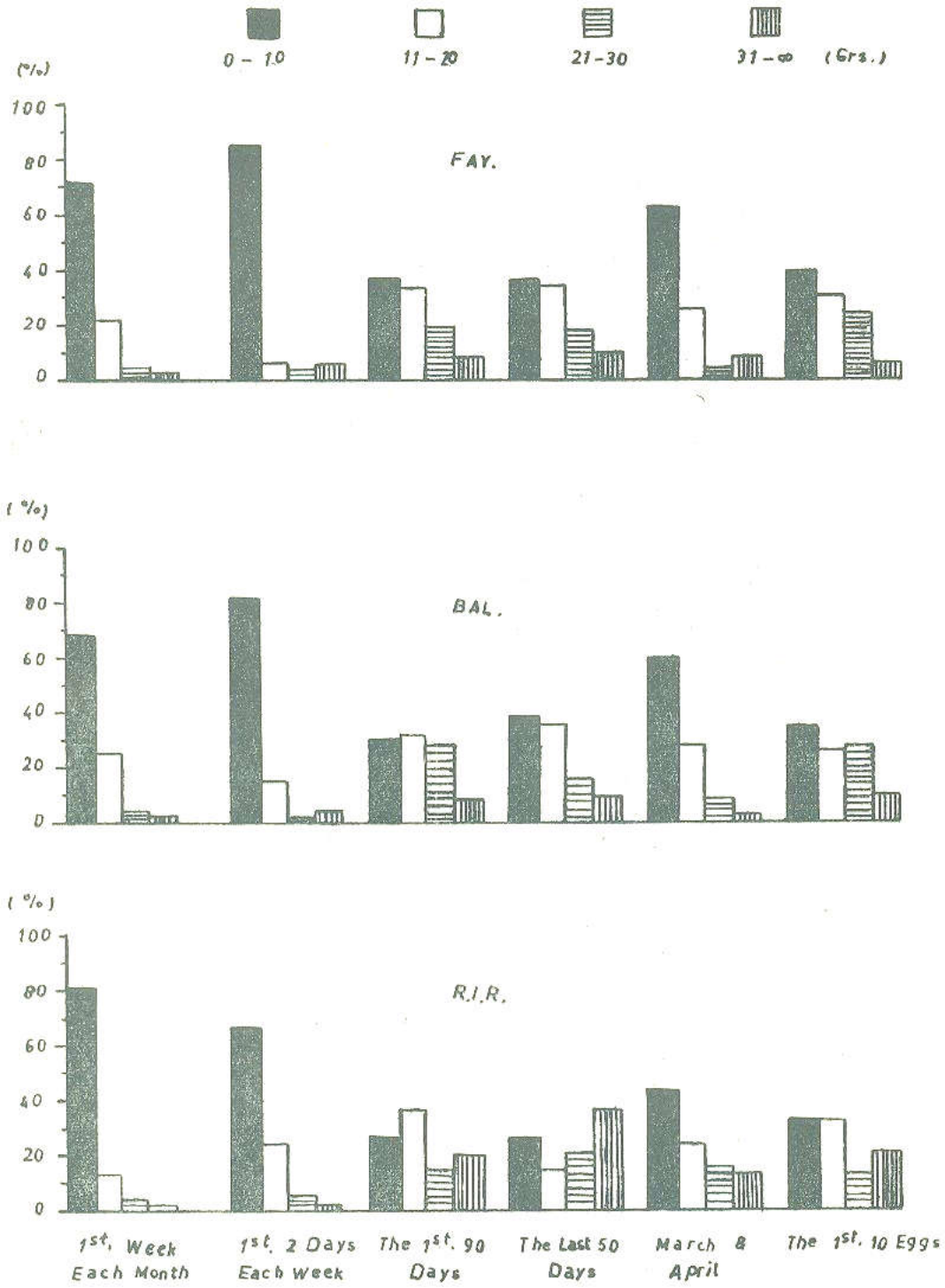

FIGURE 2.—Percentage of Birds Deviating from theActual Egg Weight Records in the Different Mentioned Methods of Partial Recording (for egg weight).

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ملخص

تطبيق نظام التسجيل الجزئى
فى إنتـاج البيض

شملت التجربة سجلات البيض لعامى ١٩٥٩ و ١٩٦٠ فى مزرعة الدواجن الخاصة بقسم الإنتاج الحيوانى لـكلية الزراعة بالجيزة . وقد شمل البحث سجلات ٢٠٠ دجاجة من الفيومى والبلدى والرود أيلند والتى أتمت نضجها الجنسى فى الصيف أو فى الخريف . وقد قورنت بعض نظم التسجيل الجزئى بالتسجيل الشامل . وكانت هذه النظم هى :

١ — التسجيل لمدة أسبوع واحد كل شهر .

٢ — التسجيل لمدة التسعين يوماً الأولى من ابتداء وضع البيض .

٣ — التسجيل لمدة الستين يوماً الأخيرة من سنة البيض .

٤ — التسجيل لمدة يومين فقط كل أسبوع .

٥ — التسجيل فى شهرى مارس وأبريل فقط .

٦ — التسجيل لمدة العشرة بيضات الأولى فقط .

وتتلخص نتائج البحث فيما يلى :

أولا : أن أحسن نظم التسجيل الجزئى كانت التسجيل لمدة يومين كل أسبوع فقد كان معامل التلازم بين ناتج البيض المحسوب بهذه الطريقة وناتج البيض السنوى المحسوب على طريقة التسجيل الـكلى ٥٨و٠ وكانت سجلات ٧٠٪ من الدجاج المحسوبة بهذه الطريقـة تقل عن واقع التسجيل بأقل من ١٠ بيضات هذا بالإضافة إلى أن العلاقة بين أوزان البيض المحسوبة

بهذه الطريقة والوزن المحسوب على طريقة التسجيل الشامل كانت وثيقة جداً .

ثانياً : كانت الطريقة التى تلى الطريقة السابقة فى الدقة هى طريقة التسجيل لمدة أسبوع واحد كل شهر وكانت دقة هذه الطريقة فى الفيومى والبلدى على مستوٍ واحد وعلل هذا بأن هاتين السلالتين كانتا على مستوٍ واحد فى الاستجابة للظروف المحيطة لكل منهما .

ثالثاً : كانت طريقة التسجيل لمدة ٩٠ يوماً ذات دلالة متوسطة بالمقارنة مع الطرق السابقة . ولعل توافق وقوع النضج الجنسى مع بدء موسم الصيف وهو أسوأ فصول السنة تأثيراً على ناتج البيض يكون مسئولاً عن هذه النتيجة . لذلك يقترح عند استخدام هذه الطريقة ألا يقتصر على التسجيل فى هذه المدة فقط بل يحسن اتباعها بتسجيل جزئى آخر لبقية العام حتى يمكن الحصول على نتائج أكثر دقة .

رابعاً : ظهر أن بقية طرق التسجيل الأخرى كانت ذات دلالة متوسطة والأرقام التى حصل عليها عند التسجيل للعشرة بيضات الأولى فقط تستحق التأمل إذ أنه يمكن اعتبار هذه الطريقة من أحسن الطرق دلالة عند حساب وزن البيض بالنسبة لظروف الفلاح العادى . هذا بالإضافة إلى أن دلالة هذه الطريقة تكون أقوى وأدق إذا ما وحد أثر العمر والوزن عند النضج الجنسى .