

PROFIT CALCULATOR FOR EGGS



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University of Arizona, Tucson

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PROFIT CALCULATOR FOR EGGS

By H. EMBLETON

INTRODUCTION

A feed-egg ratio is the number of dozens of eggs at current prices it will take to buy 100 pounds of complete ration at current prices.

Example: Eggs 67 cents a dozen divided into feed at \$5.50 for 100 pounds of complete ration = feed-egg ratio of 1 : 8.2.

The feed-egg ratio is generally accepted as a measuring stick for profits from egg sales, as it deals with the largest item of overhead, feed cost, which incidentally is also the most fluctuating item of cost of any of the factors of overhead, and the vital factor of the selling price of eggs. The feed cost is generally considered to be 60 per cent of the entire overhead of egg production on a cost accounting basis.

Although the feed-egg ratio is generally considered a measuring stick, there has been no information forthcoming which would indicate the feed-egg ratio which would be a division between profitable and unprofitable egg production. With a view of ascertaining just which feed-egg ratio would act as a dividing line the writer has made many calculations and comparisons which are enlightening and are set forth herewith.

DISCUSSION

In order to have a starting point certain factors had to be assumed. These assumed factors follow:

1. Feed cost 60 per cent of entire overhead on a cost accounting basis.
2. Remaining overhead of depreciation, interest, replacement of flock, transportation, water costs, labor, etc., 40 per cent.
3. Feed consumption per bird per year, 80 pounds.
4. Eggs laid per bird per year, 13 dozen.
5. Egg prices used here refer to prices received by the producer, and are equivalent to wholesale prices to the retailer.

Using the above assumed conditions, Table 1 was established. In this table, which incidentally represents the average circumstances under which the majority of eggs is produced, the following information is set forth:

1. A range of egg prices per dozen to the producer.
2. A range of feed prices per 100 pounds of complete ration.
3. A range of feed-egg ratios based on the first two factors.
4. Feed cost per hen per year.

5. Total overhead cost per hen per year.
6. Total receipts per hen per year.
7. Net profit or loss per hen per year.

Table 1 can be used to find what the net profit per bird per year will be within the price ranges of feed and eggs set forth in this table.

TABLE 1.—FACTORS DETERMINING PROFIT OR LOSS IN EGG PRODUCTION ON A "COST ACCOUNTING" BASIS*

1	2	3	4	5	6	7	
Wholesale price per doz.	Cwt. feed	Feed-egg ratio	Feed cost bird	Total* cost	Total receipts	Net profit or loss	
	\$7.00	1 : 8.2	\$5.60	\$9.33	\$11.05	+\$1.72	
Eggs 85c	6.50	1 : 7.6	5.20	8.67	11.05	+ 2.38	
	6.00	1 : 7.1	4.80	8.00	11.05	+ 3.05	
	5.50	1 : 6.5	4.40	7.33	11.05	+ 3.72	
	5.00	1 : 5.9	4.00	6.67	11.05	+ 4.38	
	4.50	1 : 5.3	3.60	6.00	11.05	+ 5.05	
	4.00	1 : 4.7	3.20	5.33	11.05	+ 5.72	
	3.50	1 : 4.1	2.80	4.67	11.05	+ 6.38	
	7.00	1 : 8.7	5.60	9.33	10.40	+ 1.07	
Eggs 80c	6.50	1 : 8.1	5.20	8.67	10.40	+ 1.73	
	6.00	1 : 7.5	4.80	8.00	10.40	+ 2.40	
	5.50	1 : 6.9	4.40	7.33	10.40	+ 3.07	
	5.00	1 : 6.2	4.00	6.67	10.40	+ 3.73	
	4.50	1 : 5.6	3.60	6.00	10.40	+ 4.40	
	4.00	1 : 5.0	3.20	5.33	10.40	+ 5.07	
	3.50	1 : 4.4	2.80	4.67	10.40	+ 5.73	
	7.00	1 : 9.5	5.60	9.33	9.75	+ .42	
	6.50	1 : 8.7	5.20	8.67	9.75	+ 1.08	
Eggs 75c	6.00	1 : 8.0	4.80	8.00	9.75	+ 1.75	
	5.50	1 : 7.3	4.40	7.33	9.75	+ 2.42	
	5.00	1 : 6.7	4.00	6.67	9.75	+ 3.08	
	4.50	1 : 6.0	3.60	6.00	9.75	+ 3.75	
	4.00	1 : 5.3	3.20	5.33	9.75	+ 4.42	
	3.50	1 : 4.7	2.80	4.67	9.75	+ 5.08	
		7.00	1 : 10.0	5.60	9.33	9.10	— .23
	6.50	1 : 9.3	5.20	8.67	9.10	+ .43	
	6.00	1 : 8.6	4.80	8.00	9.10	+ 1.10	
Eggs 70c	5.50	1 : 7.8	4.40	7.33	9.10	+ 1.77	
	5.00	1 : 7.1	4.00	6.67	9.10	+ 2.43	
	4.50	1 : 6.4	3.60	6.00	9.10	+ 3.10	
	4.00	1 : 5.7	3.20	5.33	9.10	+ 3.77	
	3.50	1 : 5.0	2.80	4.67	9.10	+ 4.43	
		7.00	1 : 10.8	5.60	9.33	8.45	— .88
		6.50	1 : 10.0	5.20	8.67	8.45	— .22
	6.00	1 : 9.2	4.80	8.00	8.45	+ .45	
	5.50	1 : 8.5	4.40	7.33	8.45	+ 1.12	
Eggs 65c	5.00	1 : 7.7	4.00	6.67	8.45	+ 1.78	
	4.50	1 : 6.9	3.60	6.00	8.45	+ 2.45	
	4.00	1 : 6.1	3.20	5.33	8.45	+ 3.12	
	3.50	1 : 5.4	2.80	4.67	8.45	+ 3.78	

TABLE 1.—Continued

Wholesale price per doz.	Cwt. feed	Feed-egg ratio	Feed cost bird	Total* cost	Total receipts	Net profit or loss	
Eggs 60c	7.00	1 : 11.7	5.60	9.33	7.80	— 1.53	
	6.50	1 : 10.8	5.20	8.67	7.80	— .87	
	6.00	1 : 10.0	4.80	8.00	7.80	— .20	
	5.50	1 : 9.2	4.40	7.33	7.80	+ .47	
	5.00	1 : 8.3	4.00	6.67	7.80	+ 1.13	
	4.50	1 : 7.5	3.60	6.00	7.80	+ 1.80	
	4.00	1 : 6.7	3.20	5.33	7.80	+ 2.47	
	3.50	1 : 5.8	2.80	4.67	7.80	+ 3.13	
	Eggs 55c	7.00	1 : 12.7	5.60	9.33	7.15	— 2.18
		6.50	1 : 11.0	5.20	8.67	7.15	— 1.52
6.00		1 : 10.9	4.80	8.00	7.15	— .85	
5.50		1 : 10.0	4.40	7.33	7.15	— .18	
5.00		1 : 9.1	4.00	6.67	7.15	+ .48	
4.50		1 : 8.2	3.60	6.00	7.15	+ 1.15	
4.00		1 : 7.3	3.20	5.33	7.15	+ 1.82	
3.50		1 : 6.4	2.80	4.67	7.15	+ 2.48	
Eggs 50c		7.00	1 : 14.0	5.60	9.33	6.50	— 2.83
		6.50	1 : 13.0	5.20	8.67	6.50	— 2.17
	6.00	1 : 12.0	4.80	8.00	6.50	— 1.50	
	5.50	1 : 11.0	4.40	7.33	6.50	— .83	
	5.00	1 : 10.0	4.00	6.67	6.50	— .17	
	4.50	1 : 9.0	3.60	6.00	6.50	+ .50	
	4.00	1 : 8.0	3.20	5.33	6.50	+ 1.17	
	3.50	1 : 7.0	2.80	4.67	6.50	+ 1.83	
	Eggs 45c	7.00	1 : 15.5	5.60	9.33	5.85	— 3.48
		6.50	1 : 14.4	5.20	8.67	5.85	— 2.82
6.00		1 : 13.3	4.80	8.00	5.85	— 2.15	
5.50		1 : 12.2	4.40	7.33	5.85	— 1.48	
5.00		1 : 11.1	4.00	6.67	5.85	— .82	
4.50		1 : 10.1	3.60	6.00	5.85	— .15	
4.00		1 : 8.9	3.20	5.33	5.85	+ .52	
3.50		1 : 7.8	2.80	4.67	5.85	+ 1.18	
Eggs 40c		7.00	1 : 17.5	5.60	9.33	5.20	— 4.13
		6.50	1 : 16.2	5.20	8.67	5.20	— 3.47
	6.00	1 : 15.0	4.80	8.00	5.20	— 2.80	
	5.50	1 : 13.7	4.40	7.33	5.20	— 2.13	
	5.00	1 : 12.5	4.00	6.67	5.20	— 1.47	
	4.50	1 : 11.2	3.60	6.00	5.20	— .80	
	4.00	1 : 10.0	3.20	5.33	5.20	— .13	
	3.50	1 : 8.7	2.80	4.67	5.20	+ .53	
	Eggs 35c	7.00	1 : 20.0	5.60	9.33	4.55	— 4.78
		6.50	1 : 18.6	5.20	8.67	4.55	— 4.12
6.00		1 : 17.1	4.80	8.00	4.55	— 3.45	
5.50		1 : 15.7	4.40	7.33	4.55	— 2.78	
5.00		1 : 14.3	4.00	6.67	4.55	— 2.12	
4.50		1 : 12.8	3.60	6.00	4.55	— 1.45	
4.00		1 : 11.4	3.20	5.33	4.55	— .78	
3.50		1 : 10.0	2.80	4.67	4.55	— .12	

*Feed cost plus 40 per cent.

There are two methods used by which profits to the producer are calculated. The one, the "out of pocket" method is the one

most commonly used, although not rightly so. In this method only actual cash outlay is included in the overhead cost, no consideration being given to such additional legitimate costs as interest, labor, and depreciation. The other method a true "cost accounting" method, and the one which should be used includes interest, labor, and depreciation in the overhead cost, in addition to the "out of pocket" costs. Both methods are used in these calculations in order that a comparison may be made between the two methods.

TABLE 2.—FACTORS DETERMINING PROFIT OR LOSS IN EGG PRODUCTION OF AN "OUT OF POCKET" BASIS*

1	2	3	4	5	6
Wholesale price per doz.	Cwt. feed	Feed-cost per bird	Total cost*	Total receipts	Net profit or loss
Eggs 85c	\$7.00	\$5.60	\$7.46	\$11.05	+\$3.59
	6.50	5.20	6.93	11.05	+ 4.12
	6.00	4.80	6.40	11.05	+ 4.65
	5.50	4.40	5.86	11.05	+ 5.19
	5.00	4.00	5.33	11.05	+ 5.72
	4.50	3.60	4.80	11.05	+ 6.25
	4.00	3.20	4.26	11.05	+ 6.79
	3.50	2.80	3.73	11.05	+ 7.32
Eggs 80c	7.00	5.60	7.46	10.40	+ 2.94
	6.50	5.20	6.93	10.40	+ 3.47
	6.00	4.80	6.40	10.40	+ 4.00
	5.50	4.40	5.86	10.40	+ 4.54
	5.00	4.00	5.33	10.40	+ 5.07
	4.50	3.60	4.80	10.40	+ 5.60
	4.00	3.20	4.26	10.40	+ 6.14
	3.50	2.80	3.73	10.40	+ 6.67
Eggs 75c	7.00	5.60	7.46	9.75	+ 2.29
	6.50	5.20	6.93	9.75	+ 2.82
	6.00	4.80	6.40	9.75	+ 3.35
	5.50	4.40	5.86	9.75	+ 3.89
	5.00	4.00	5.33	9.75	+ 4.42
	4.50	3.60	4.80	9.75	+ 4.95
	4.00	3.20	4.26	9.75	+ 5.49
	3.50	2.80	3.73	9.75	+ 6.02
Eggs 70c	7.00	5.60	7.46	9.10	+ 1.64
	6.50	5.20	6.93	9.10	+ 2.17
	6.00	4.80	6.40	9.10	+ 2.70
	5.50	4.40	5.86	9.10	+ 3.24
	5.00	4.00	5.33	9.10	+ 3.77
	4.50	3.60	4.80	9.10	+ 4.30
	4.00	3.20	4.26	9.10	+ 4.84
	3.50	2.80	3.73	9.10	+ 5.37
Eggs 65c	7.00	5.60	7.46	8.45	+ .99
	6.50	5.20	6.93	8.45	+ 1.52
	6.00	4.80	6.40	8.45	+ 2.05
	5.50	4.40	5.86	8.45	+ 2.59
	5.00	4.00	5.33	8.45	+ 3.12
	4.50	3.60	4.80	8.45	+ 3.65
	4.00	3.20	4.26	8.45	+ 4.19
	3.50	2.80	3.73	8.45	+ 4.72

TABLE 2.—Continued

Wholesale price per doz.	Cwt. feed	Feed-cost per bird	Total cost*	Total receipts	Net profit or loss
Eggs 60c	7.00	5.60	7.46	7.80	+ .34
	6.50	5.20	6.93	7.80	+ .87
	6.00	4.80	6.40	7.80	+ 1.40
	5.50	4.40	5.86	7.80	+ 1.94
	5.00	4.00	5.33	7.80	+ 2.47
	4.50	3.60	4.80	7.80	+ 3.00
	4.00	3.20	4.26	7.80	+ 3.54
3.50	2.80	3.73	7.80	+ 4.07	
Eggs 55c	7.00	5.60	7.46	7.15	— .33
	6.50	5.20	6.92	7.15	+ .23
	6.00	4.80	6.40	7.15	+ .75
	5.50	4.40	5.86	7.15	+ 1.29
	5.00	4.00	5.33	7.15	+ 1.82
	4.50	3.60	4.80	7.15	+ 2.35
	4.00	3.20	4.26	7.15	+ 2.89
3.50	2.80	3.73	7.15	+ 3.42	
Eggs 50c	7.00	5.60	7.46	6.50	— .96
	6.50	5.20	6.92	6.50	— .42
	6.00	4.80	6.40	6.50	+ .10
	5.50	4.40	5.86	6.50	+ .64
	5.00	4.00	5.33	6.50	+ 1.17
	4.50	3.60	4.80	6.50	+ 1.70
	4.00	3.20	4.26	6.50	+ 2.24
3.50	2.80	3.73	6.50	+ 2.77	
Eggs 45c	7.00	5.60	7.46	5.85	— 1.61
	6.50	5.20	6.93	5.85	— 1.08
	6.00	4.80	6.40	5.85	— .55
	5.50	4.40	5.86	5.85	— .01
	5.00	4.00	5.33	5.85	+ .52
	4.50	3.60	4.80	5.85	+ 1.05
	4.00	3.20	4.26	5.85	+ 1.59
3.50	2.80	3.73	5.85	+ 2.12	
Eggs 40c	7.00	5.60	7.46	5.20	— 2.26
	6.50	5.20	6.93	5.20	— 1.73
	6.00	4.80	6.40	5.20	— 1.20
	5.50	4.40	5.86	5.20	— .66
	5.00	4.00	5.33	5.20	— .13
	4.50	3.60	4.80	5.20	+ .40
	4.00	3.20	4.26	5.20	+ .94
3.50	2.80	3.73	5.20	+ 1.47	
Eggs 35c	7.00	5.60	7.46	4.55	— 2.91
	6.50	5.20	6.92	4.55	— 2.37
	6.00	4.80	6.40	4.55	— 1.85
	5.50	4.40	5.86	4.55	— 1.31
	5.00	4.00	5.33	4.55	— .78
	4.50	3.60	4.80	4.55	— .25
	4.00	3.20	4.26	4.55	+ .29
3.50	2.80	3.73	4.55	+ .82	

*Feed cost plus 25 per cent.

The original purpose was to find if there was a feed-egg ratio that would act as a division between profit and loss. In an attempt to establish such a point, feed-egg ratios were established for

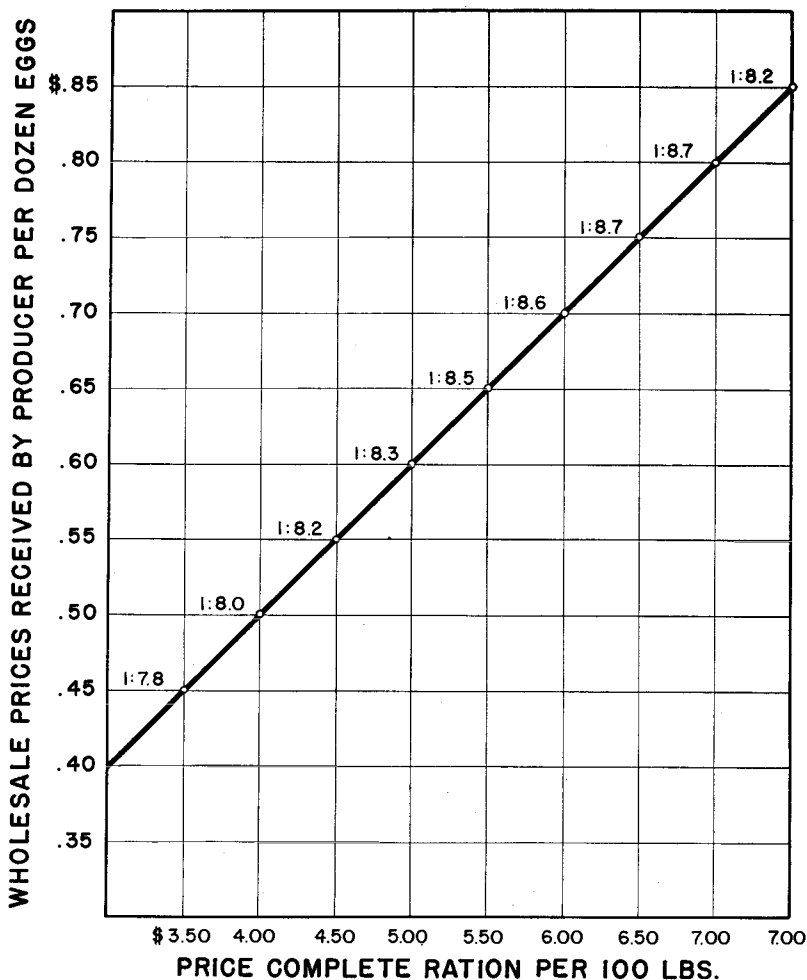


Figure 1.—A comparison of feed prices, wholesale prices of eggs per dozen, and feed-egg ratios to assure a net profit of at least \$1 a bird a year on a cost accounting basis.

various ranges of egg and feed prices which would assure a net profit of \$1 a bird a year (Fig. 1). When this was done it was found that the feed-egg ratio was not fixed at a definite point which marked the division between profit and loss, but varied from 1 : 7.8 to 1 : 8.2 with eggs ranging in prices per dozen from 35 cents to 85 cents wholesale and feed ranging from \$3.50 to \$7.00 per 100 pounds of complete ration, and that with an advance in feed price if there was an advance in egg price the feed-egg ratio could also be wider and still assure a net profit of \$1 a year per bird.

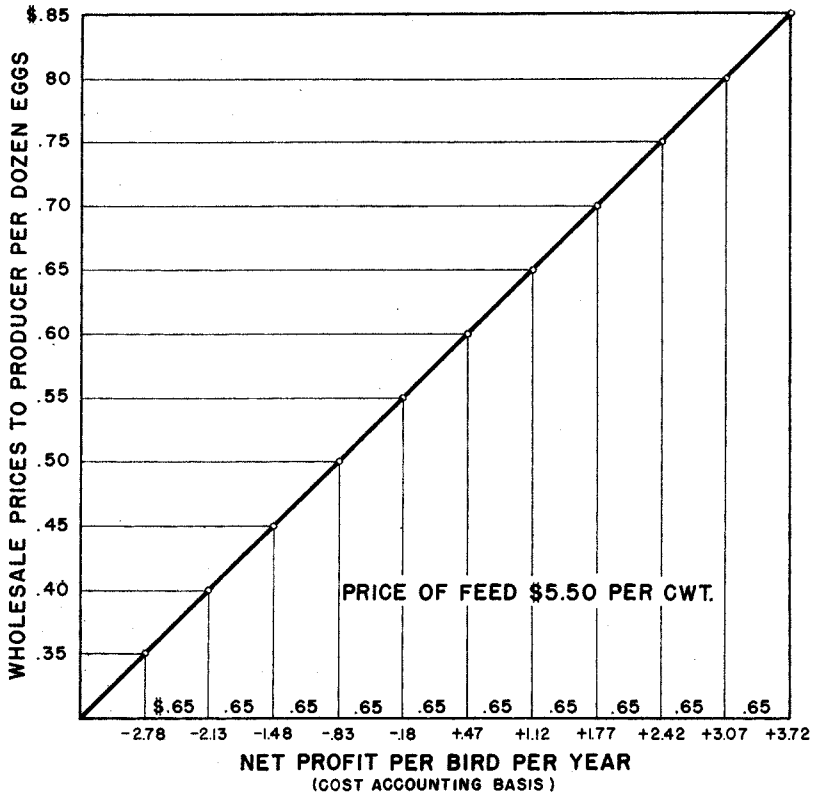


Figure 2.—A comparison of net profits with egg prices, the price of 100 pounds of complete ration being constant at \$5.50.

It was also found that an advance in egg price of 5 cents a dozen would offset an advance in feed price of 50 cents.

Figure 2 shows that with feed prices for a complete ration constant at \$5.50 per 100 pounds, the net profit increased 65 cents a bird with each advance of 5 cents in the price of eggs per dozen and that with any constant feed price this same relationship held true (see Table 1).

Figure 3 indicates that the net profit per bird per year decreased approximately 67 cents with each 50-cent increase in feed price when the egg price was at a constant level and that this same relationship existed with any given egg price level.

That there is a wider range in the feed-egg ratios with feeds from \$3.50 to \$7.00 a hundredweight with low egg prices compared with high-priced eggs is quite evident from Figure 4. With eggs at 85 cents a dozen to the producer, there is a variation of only 4.1 in the feed-egg ratios, while with eggs at 35 cents a dozen the variation is 10.0 for the same price range in feeds. This would

TABLE 3.—MONTHLY WHOLESALE PRICES PER DOZEN EGGS BY SIZES FROM JULY 1, 1947 THROUGH JUNE 30, 1948*

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Yearly Average
Large	\$.65	\$.70	\$.75	\$.77	\$.77	\$.81	\$.76	\$.70	\$.64	\$.60	\$.60	\$.63	\$.698
Medium	.60	.64	.70	.73	.73	.77	.71	.65	.60	.57	.57	.58	.654
Small	.52	.54	.58	.59	.59	.63	.60	.57	.52	.50	.50	.52	.555

*Based on egg price cards issued by the Southern Arizona Poultry Association at Tucson, Arizona.

TABLE 4.—PERCENTAGE OF EGG SIZES LAID EACH MONTH*

Large	74	77	80	45.5	72	83	88.5	91.2	86.8	84.2	81.2	77.7	78.4
Medium	8	8	34	47.8	25	13	6.5	4.5	3.2	3.5	4.2	3.0	13.4
Small	.....	.....	....	3.0	0.3	0.12	.....	.....	.....	.....	.....	.....	2.9

*From final report second California Official Egg Laying Test 1941-42.

TABLE 5.—WEIGHTED AVERAGE MONTHLY WHOLESALE PRICE PER DOZEN EGGS ALL SIZES

\$.645	\$.694	\$.748	\$.745	\$.754	\$.804	\$.757	\$.697	\$.638	\$.598	\$.598	\$.628
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TABLE 6.—DISTRIBUTION OF EGG PRODUCTION BY MONTHS FOR A YEARLY AVERAGE PRODUCTION OF 13 DOZEN EGGS PER HEN IN PERCENTAGES

35	30	20	30	35	40	45	50	60	60	55	45	42.5
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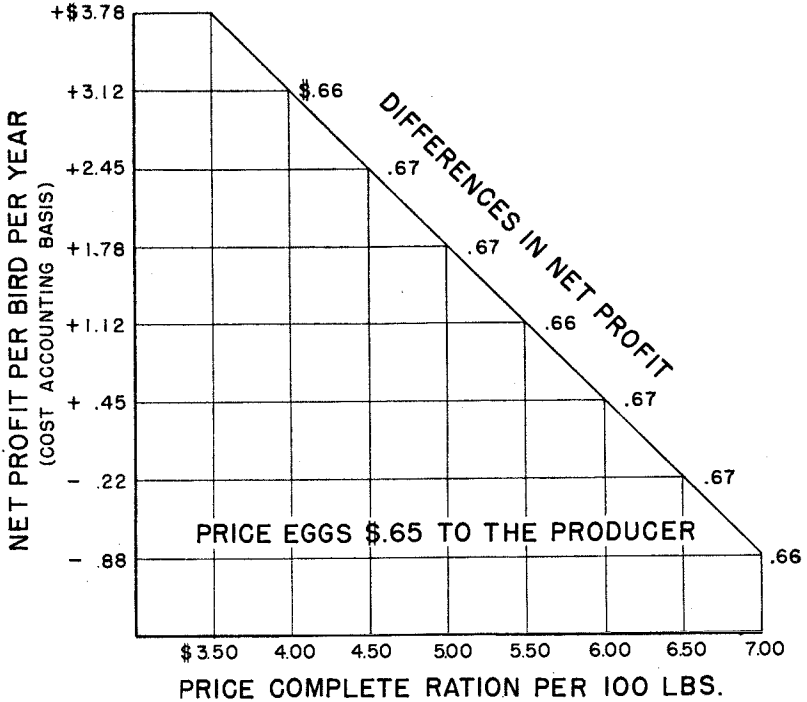


Figure 3.—A comparison of net profits with increases of 50 cents in feed prices for 100 pounds of complete ration with egg prices constant at 65 cents a dozen to the producer.

TABLE 7.—SHOWING METHOD OF CALCULATING YEARLY WEIGHTED AVERAGE WHOLESALE PRICE PER DOZEN EGGS TO RETAILERS JULY 1, 1947 THROUGH JUNE 30, 1948

Month	Weighted average monthly wholesale prices	Percentage production by months	Percentage of yearly production	Amount
July	\$.645	35%	7	\$.0451
August	.694	30%	6	.0416
September	.748	20%	4	.0299
October	.745	30%	6	.0447
November	.754	35%	7	.0528
December	.804	40%	8	.0643
January	.757	45%	8	.0605
February	.697	50%	10	.0697
March	.638	60%	12	.0765
April	.598	60%	12	.0717
May	.598	55%	11	.0658
June	.628	45%	9	.0565
			100	\$.6791

Weighted average wholesale price of eggs to retailers July, 1947, to June, 1948, inclusive for all grades, 67.9 cents.

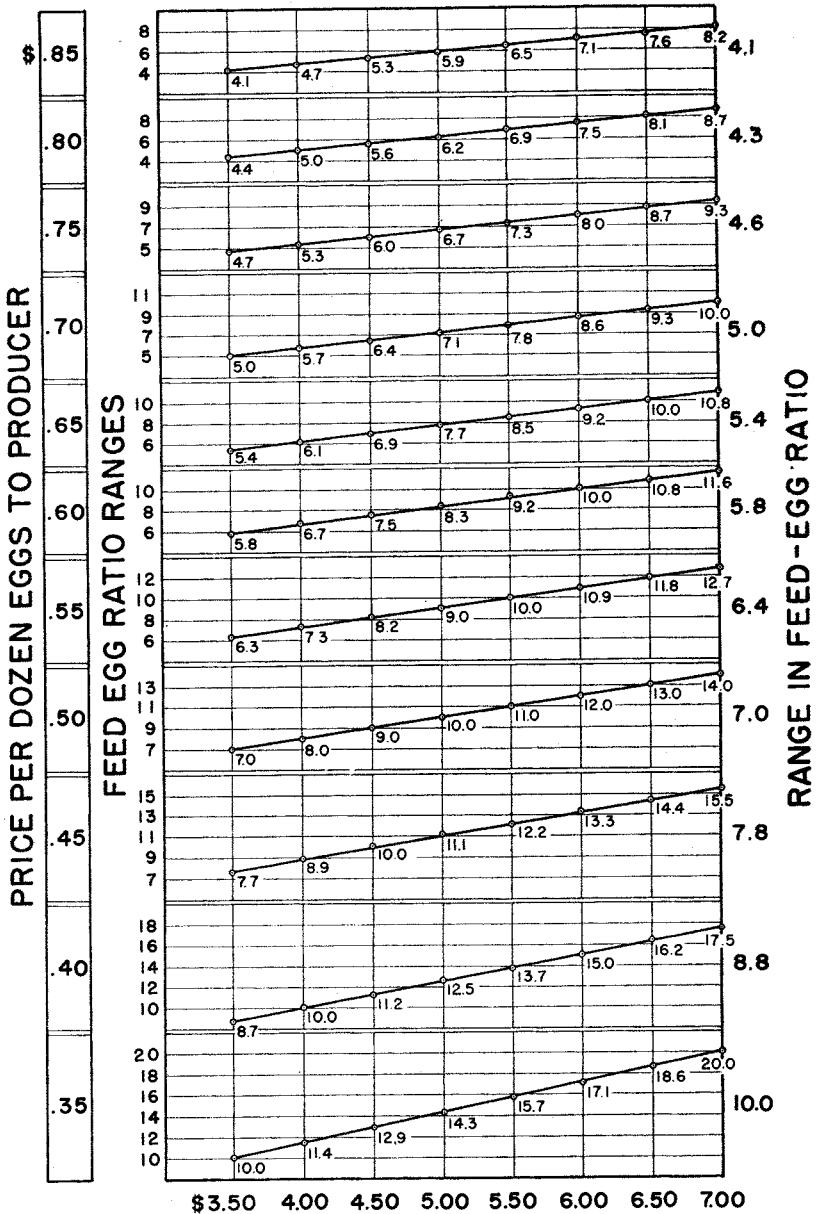


Figure 4.—A comparison of varying prices of feed and eggs to feed-egg ratios.

indicate that price changes in feeds from \$3.50 to \$7.00 a hundred-weight are not as serious from the standpoint of feed-egg ratios when eggs are high in price as they would be with low-priced eggs.

TABLE 8.—SHOWING NET PROFIT ON A “COST ACCOUNTING” BASIS AS IT VARIES ACCORDING TO THE YEARLY EGG PRODUCTION

Dozens of eggs per bird per year	Total overhead	Total income	Net profit + Net loss —
11	\$7.33	\$7.15	\$— .18
12	7.33	7.80	+ .47
13	7.33	8.45	+1.12
14	7.33	9.10	+1.77
15	7.33	9.75	+2.42
16	7.33	10.40	+3.07
17	7.33	11.05	+3.72
18	7.33	11.70	+4.37
Same as above on an “out of pocket” basis			
11	\$5.86	\$ 7.15	\$+1.29
12	5.86	7.80	+1.94
13	5.86	8.45	+2.59
14	5.86	9.10	+3.24
15	5.86	9.75	+3.89
16	5.86	10.40	+4.54
17	5.86	11.05	+5.19
18	5.86	11.70	+5.84

TABLE 9.—VARIOUS FEED CONSUMPTIONS (IN POUNDS) FOR DIFFERENT RANGES OF EGG PRODUCTION

Egg range	Number birds	Av. eggs per bird	Av. feed per bird	Feed consumed per doz. eggs
Light breeds				
125-150*	.....	137	70	7.5
151-175*	.....	162	75	6.2
176-200†	93	194	81	5.0
201-225†	81	210	84	4.8
226-250†	170	239	89	4.5
251-275†	46	257	92	4.3
Heavy breeds				
125-150*	.....	137	76	8.0
151-175*	.....	162	82	6.8
176-200†	93	185	88	5.7
201-225†	127	213	92	5.2
226-250†	61	237	96	4.8
251-275†	24	255	98	4.4

*Estimates based on data from Arizona Egg Laying Tests.

†Data taken from results in the Arizona Egg Laying Tests.

Net profits in Table 1 are based upon a yearly feed consumption of 80 pounds per bird a year for a fowl laying 156 eggs a year. From Table 2 it is evident that this is a generous feed allow-

ance. Adjustments for feed allowances for other egg ranges can be made from the information in Table 2.

Adjustments in net profits for egg productions per bird a year other than 156 eggs can be made with the use of Table 1. For example, with an average egg production of 120 eggs with egg prices at 35 cents a dozen the gross income would be \$3.50 instead of \$4.20.

If, instead, the average egg production per bird a year was 204 eggs, the gross income would be \$5.95 instead of \$4.20.

SUMMARY

1. There is no one feed-egg ratio which divides profit and loss.
2. Feed-egg ratios which assure a net profit of \$1 a bird a year vary from 1 : 4.1 to 1 : 10.0 as the price of feed advances from \$3.50 to \$7.00 per hundredweight, and eggs advanced from 35 cents to 85 cents a dozen to the producer.
3. An advance of 5 cents a dozen in eggs will absorb an increase in feed price per hundredweight of 50 cents.
4. An advance of 5 cents in eggs increases the net profit 65 cents a bird a year at a given feed price level.
5. An advance of 50 cents in feed will decrease the net profit per bird per year 67 cents with a constant egg price per dozen.
6. The higher the price per dozen eggs the less the range in feed-egg ratios at a given egg price with feed ranging in price from \$3.50 to \$7.00 for each 100 pounds of complete ration.